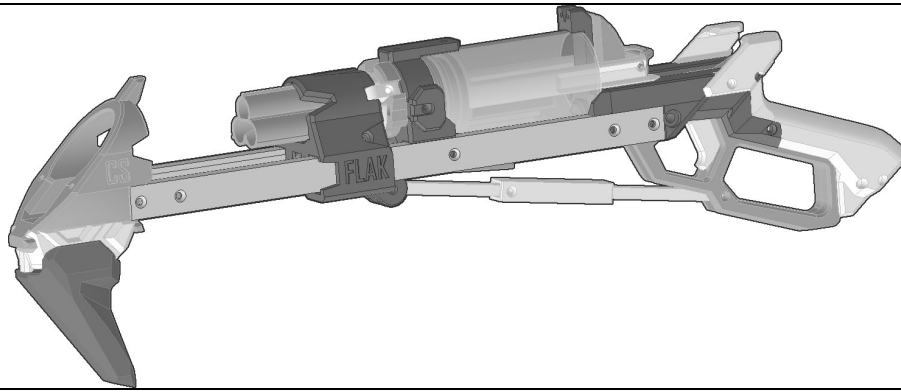


FLAK ASSEMBLY INSTRUCTIONS



The FLAK is a multi-ammo Lever-Action spring-plunger homemade blaster powered by elastic cords. It can be setup to accept and fire from Rival Mags, Talon Mags, Sledgefire Shells, Spring Thunder Shells, Trilogy Shells, spigot-launched Missiles (Demolisher Rockets), and anything you want to plug onto a 1/2 SCH40 pipe spigot. It is released as a Non-Commercial 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. All of the parts can be printed with infill as low as 20% in PLA, but I would recommend printing in layers of 200 Micron or smaller. Also set the wall/perimeters to 1.5mm to 2mm thickness.

Hardware kits and Blaster kits are available for sale. I'm producing these myself in what remains of my free time.
<https://www.etsy.com/shop/CaptainSlug>



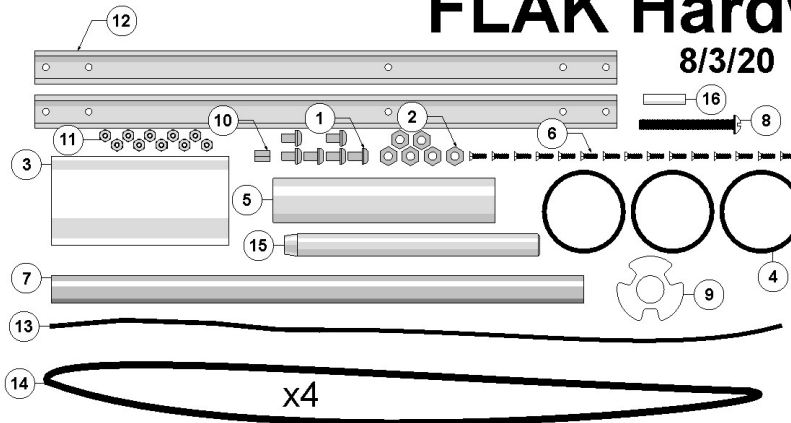
DO NOT STORE IN TEMPERATURES ABOVE 100F. Storing the blaster inside of a car in warmer months will cause the printed parts to distort or warp beyond their intended shape. If you need to store one in a vehicle temporarily, store it in the trunk.



DO NOT aim this blaster at faces. The muzzle velocities this design can reach are between 80fps and 150fps depending upon the darts used and the bands installed.

FLAK Hardware Kit

8/3/20



Item #	Quantity	Part Name
1	6	3/16" 10-32 Screws
2	6	10-32 Hex Nut
3	1	Plunger Tube
4	3	Dash 131 O-Ring
5	1	5" Rival Barrel
6	10	4-40 Screws
7	3	10" Dart Barrel
8	1	1.75" L 10-32 Screw
9	1	Shell Gasket
10	1	Round Standoff
11	10	Hex Standoffs
12	2	U-Channel (13.125")
13	1	3/32" elastic
14	4	1/8" Elastic (28" loop)
15	1	Dart Ramrod
16	1	1/4" x 3/4" #4 Spacer

Printed Parts NOT included.
Tools needed: Philips Screwdriver, Slotted Screwdriver,
Round Needle File, Scissors.

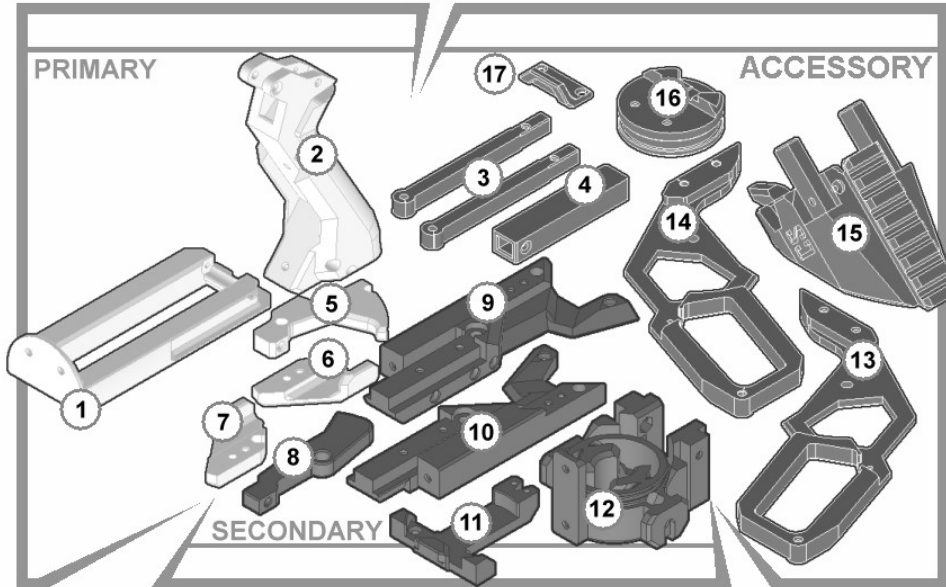
CAPTAINSLUG.COM

For most of the above hardware list the quantities are the MINIMUM required for assembly. Easily-lost items will have several spares and I typically include extras of the majority of the items. Item #19 is not used in this build.

To assemble this blaster you will need a Small Philips Screwdriver, Flat screwdriver, Scissors, and a Round Needle File. 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.

FLAK Printed Part Set

8/3/20



Item #	Quantity	Part Name
1	1	PlungerA
2	1	Grip
3	2	Linkage
4	1	LinkCoupler
5	1	Trigger
6	1	WingL
7	1	WingR
8	1	SearF
9	1	SideplateL
10	1	SideplateR
11	1	Center
12	1	Cap
13	1	LeverL
14	1	LeverR
15	1	Muzzle
16	1	PlungerB
17	1	PlungerC

		Rival Mag
		Talon Mag
		Sledgefire+ST
		Trilogy
		Missiles
		Stock
AFG	VFG	Pyrrangle
AyyFG		Iron Sights
VF1	SCAR	

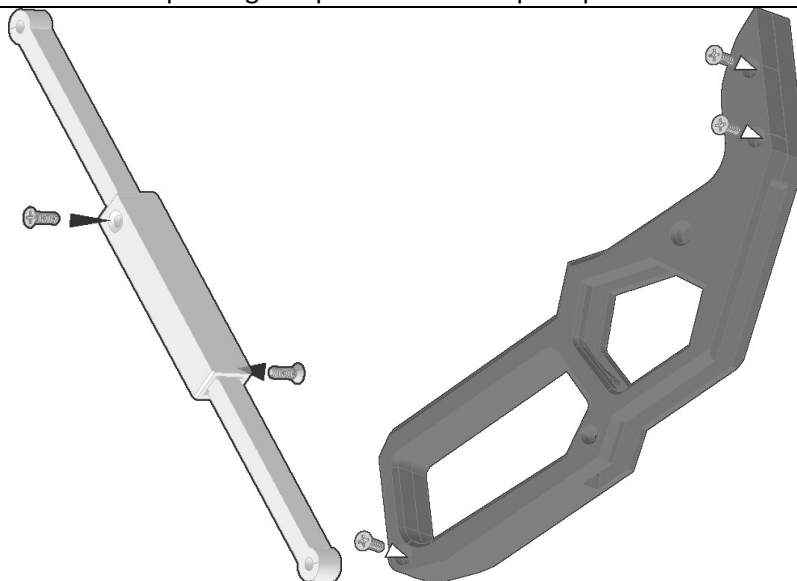
Note: Print layers should not be any larger than 200 microns. Parts were designed for PLA filament, but can be printed using ABS without issue. No support material is needed. Most of the parts should print to tolerance on their hole diameters, but results may vary so expect to have to touch up some of them with a round needle file

- Captain Slug

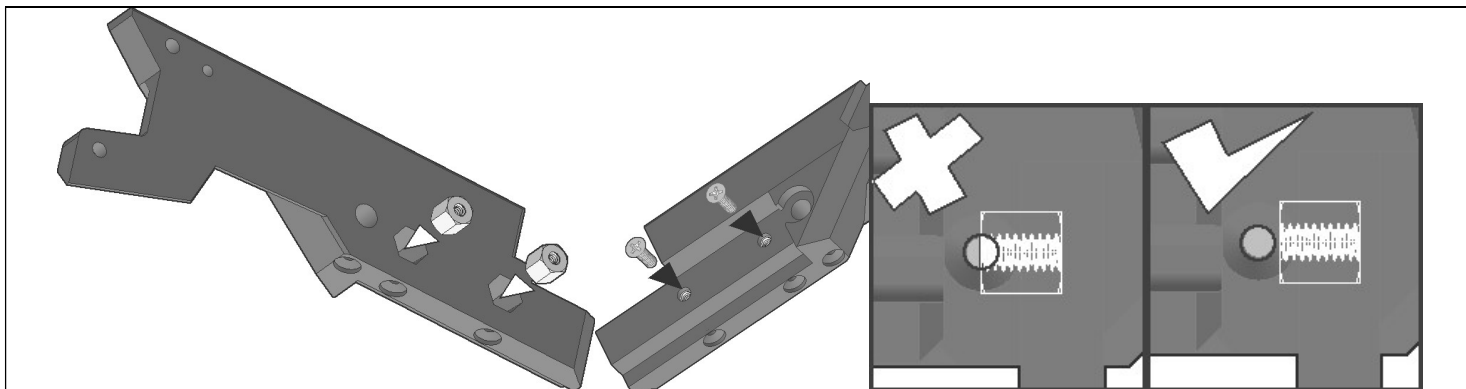
Assembly Instructions:

<http://www.captainslug.com/nerf/FLAKAssembly1.pdf>

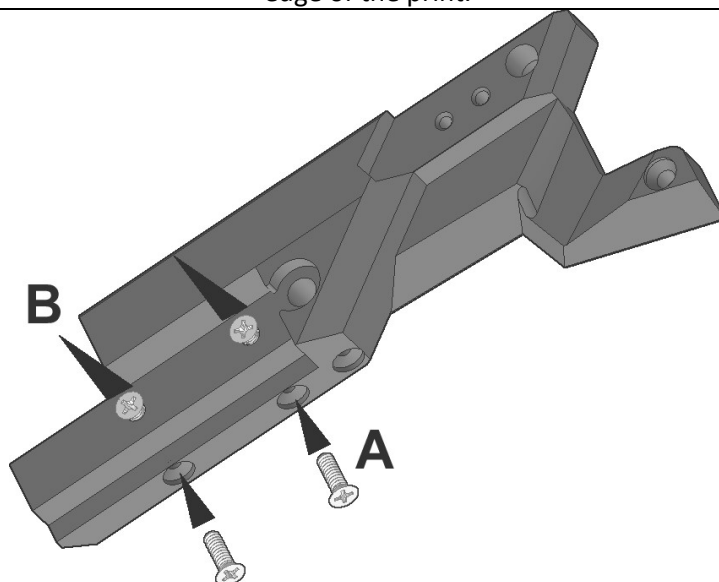
Above is a list of every printed part needed to assemble this blaster. The majority of the through holes should print to the required tolerance, but you will likely have one or two that may require minimal filing. Also make sure to trim off any burrs or oversized edges. You will also want to print the breech parts and foregrip of your choice. I also recommend printing 4 copies of the "Cordpler" print.



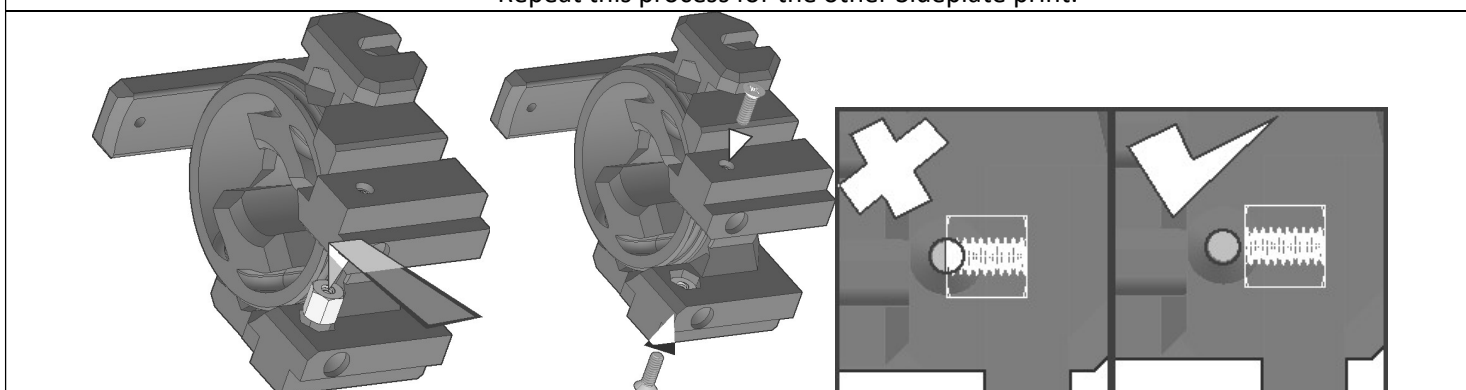
Insert a Linkage print into each end of the LinkCoupler print, then drive a 4-40 screw in from each side to secure them. Line up the holes in each LeverL and LeverR print and drive a 4-40 screw into each hole.



Force a Hex Standoff into the two sockets in the Sideplate print. Drive a 4-40 screw into them from the opposite side. Keep driving the 4-40 screw until the standoffs can no longer be seen through the perpendicular holes at the bottom edge of the print.

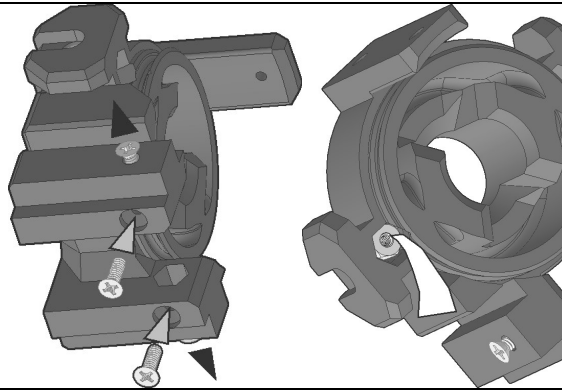


- A. Once the perpendicular holes where shown are unobstructed by the hex standoffs, drive a 4-40 screw into each. These screws will retain the standoffs and prevent them from backing out of the sockets.
- B. Remove the 4-40 screws that were used to pull the standoffs into the bottom of the sockets. Repeat this process for the other Sideplate print.

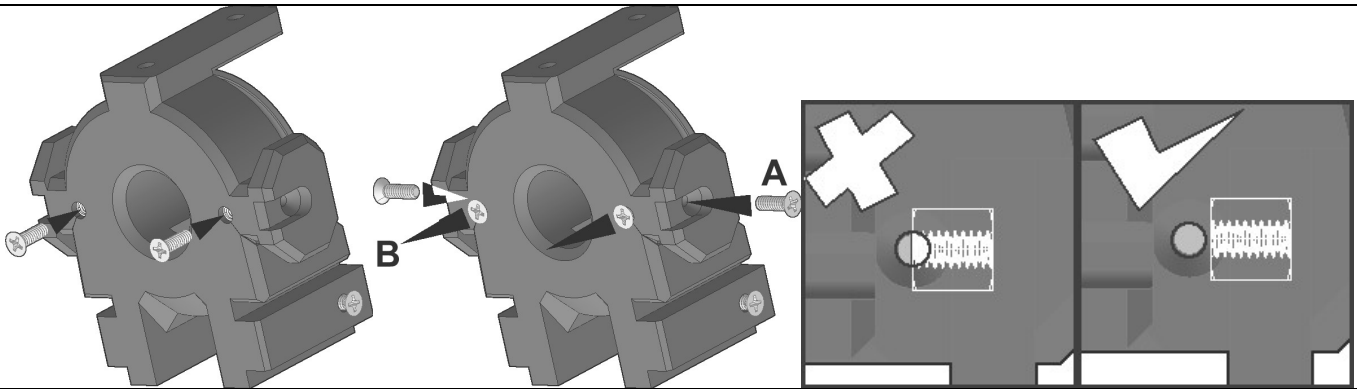


Force a Hex Standoff into the two sockets in the bottom inside of the Cap print. Drive a 4-40 screw into them from the opposite side.

Keep driving the 4-40 screw until the standoffs can no longer be seen through the perpendicular holes at the bottom edge of the print.



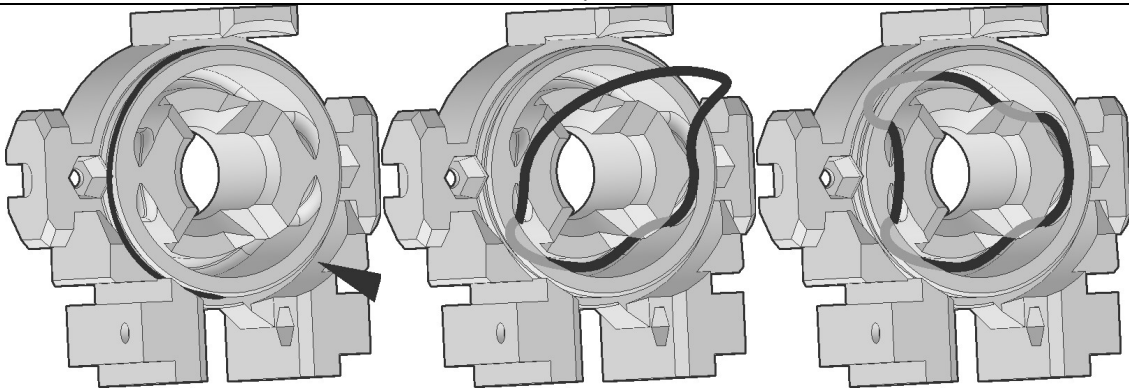
- A. Once the perpendicular holes where shown are unobstructed by the hex standoffs, drive a 4-40 screw into each. These screws will retain the standoffs and prevent them from backing out of the sockets.
- B. Remove the 4-40 screws that were used to pull the standoffs into the bottom of the sockets.
- C. Insert a Hex Standoff into each of the sloped sockets in the back of the Cap print on each side.



Drive a 4-40 screw into them from the opposite side.

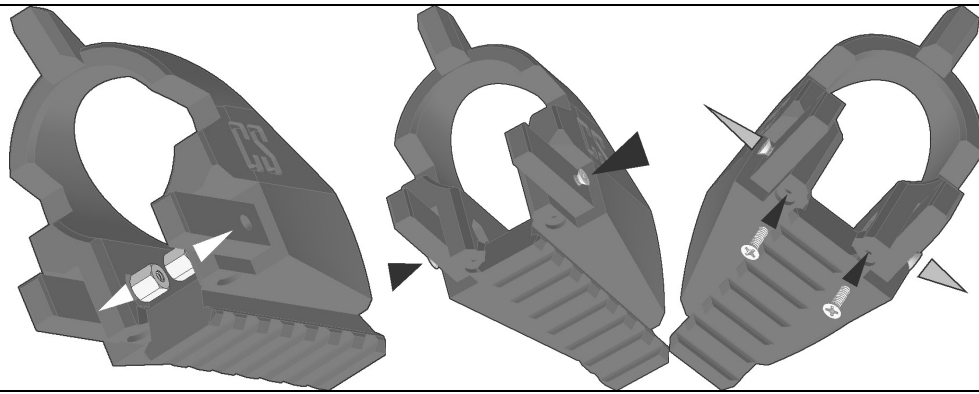
Keep driving the 4-40 screw until the standoffs can no longer be seen through the perpendicular holes at the bottom edge of the print.

- A. Once the perpendicular holes where shown are unobstructed by the hex standoffs, drive a 4-40 screw into each. These screws will retain the standoffs and prevent them from backing out of the sockets.
- B. Remove the 4-40 screws that were used to pull the standoffs into the bottom of the sockets.



Stretch a Dash 131 o-ring onto the undercut on the flange around the back of the Cap print. You will need to wedge it into the gap where indicated first.

Add a second Dash131 o-ring into the opening at the back as shown, then fold it over to fit the opposite side of the o-ring so it becomes captive.



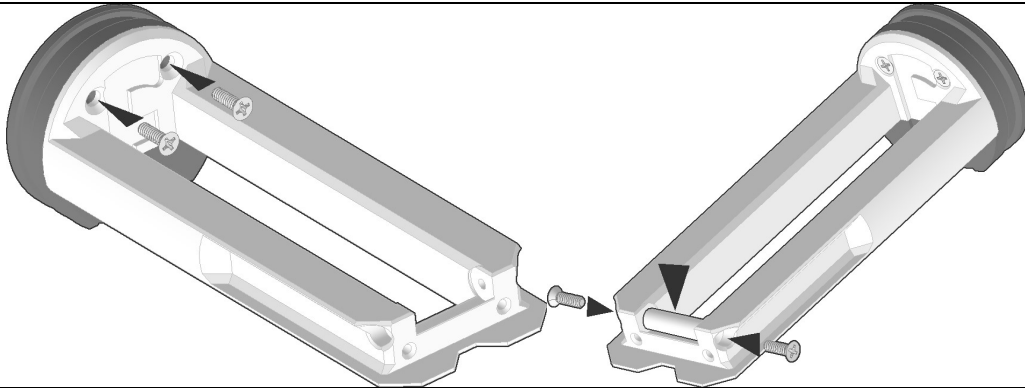
A. Force a Hex Standoff into the two sockets in the bottom inside of the Muzzle print.

B. Drive a 4-40 screw into them from the opposite side.

Keep driving the 4-40 screw until the standoffs can no longer be seen through the perpendicular holes at the bottom edge of the print.

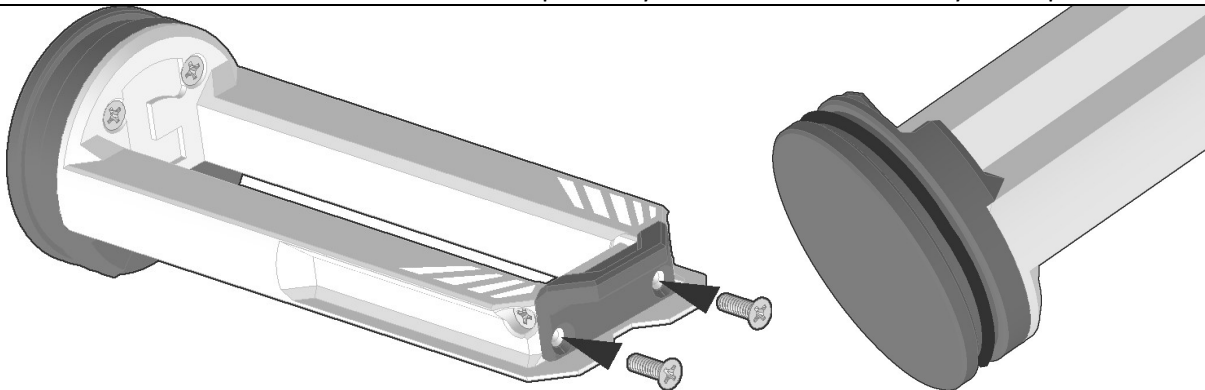
C. Once the perpendicular holes where shown are unobstructed by the hex standoffs, drive a 4-40 screw into each. These screws will retain the standoffs and prevent them from backing out of the sockets.

D. Remove the 4-40 screws that were used to pull the standoffs into the bottom of the sockets.



Attach the PlungerA and PlungerB prints with two 4-40 screws.

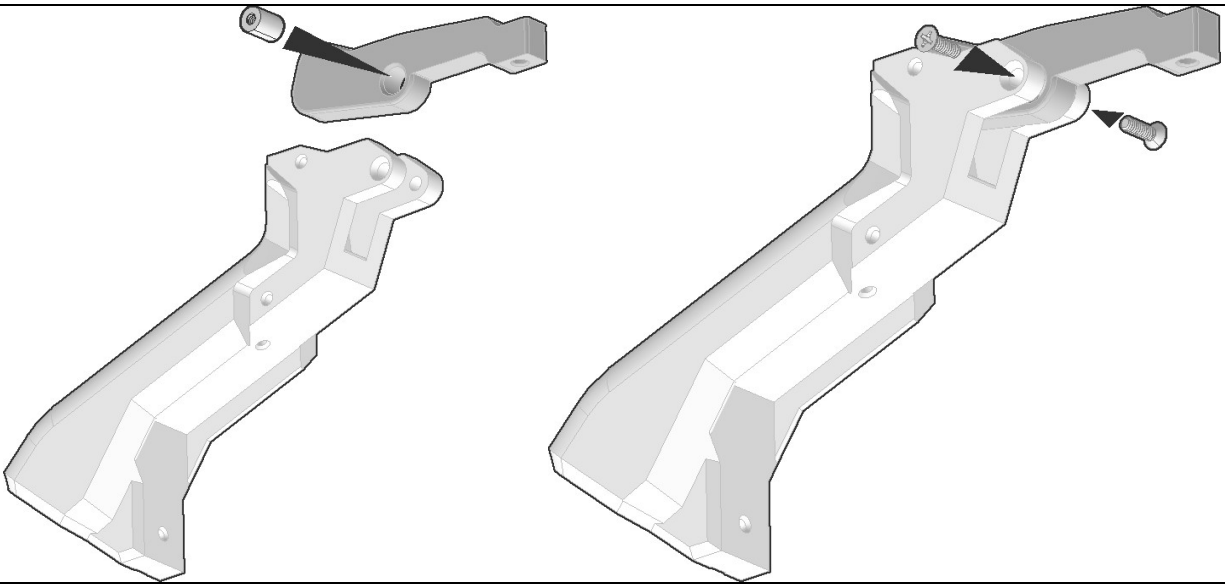
Slide the $\frac{3}{4}$ " length nylon spacer into alignment with the two holes in the back of PlungerA, then drive a 4-40 screw in from each side to retain it. It should spin freely on both screws once they are in place.



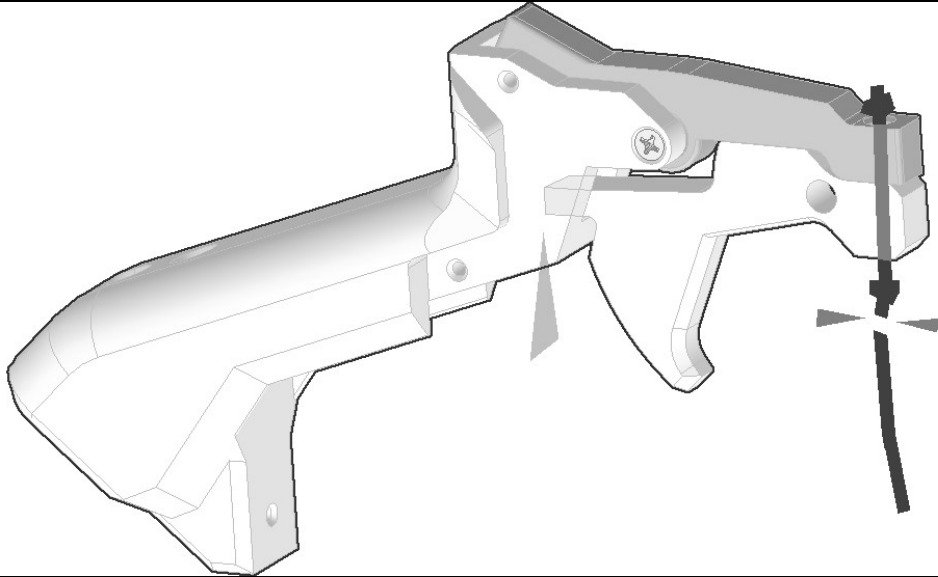
Secure PlungerC to the end of the assembly using two 4-40 screws.

If the topside of the PlungerA print is rough in the areas shown with stripes, use sandpaper or a flat file to flatten and smooth out the indicated area.

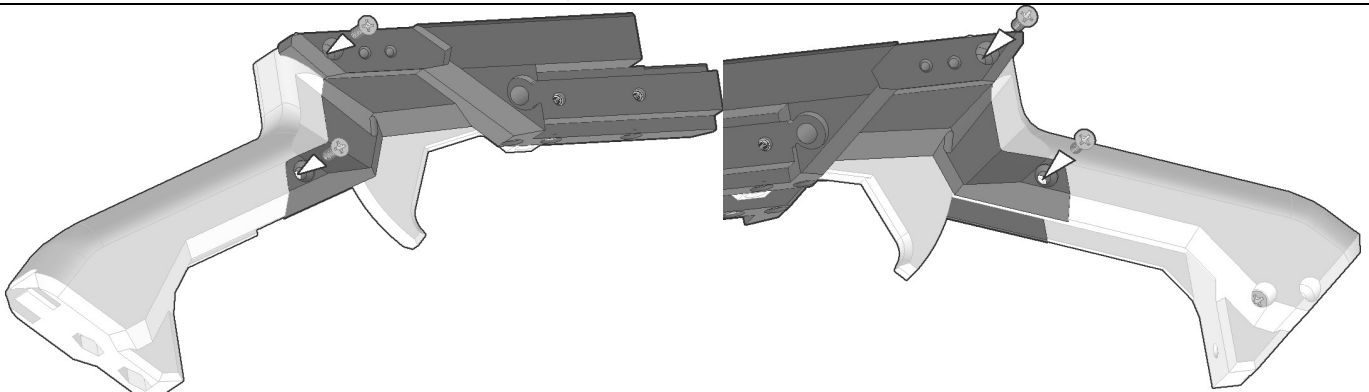
Add a Dash 131 o-ring to the undercut on the head of the Plunger assembly.



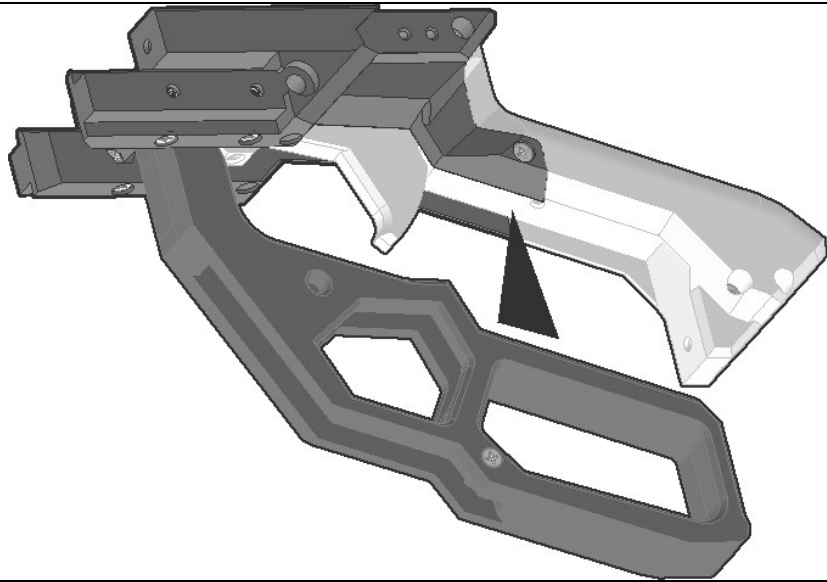
Insert a round standoff into the hole in the Sear print, then line the two up with the holes in the Grip print. Secure the round standoff in the Grip print with two 4-40 screws.



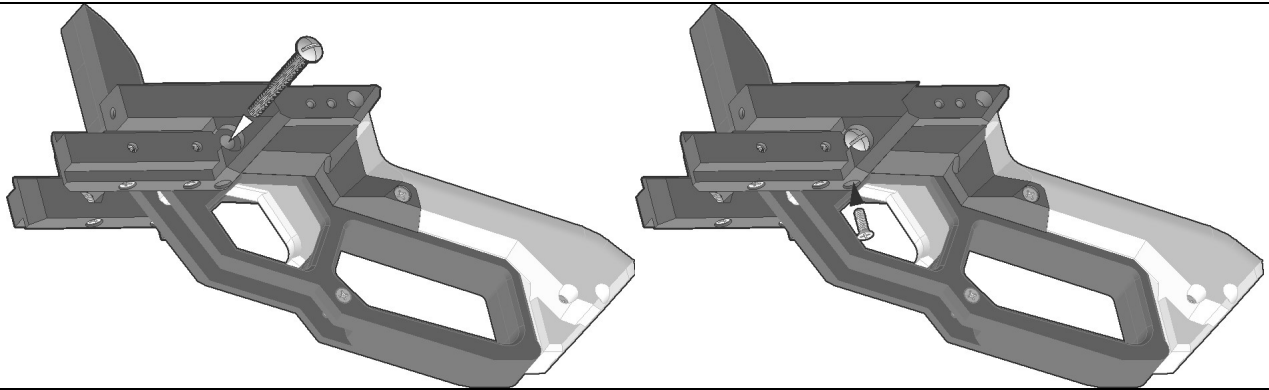
Slide the Trigger print into the Grip print so that the “heel” is resting inside.
 Tie the end of the smaller size elastic and then feed it through the holes at the front of the Sear and Trigger prints.
 Stretch it out tightly and tie a second knot close as close to the Trigger print as possible.
 Test the resulting tension by trying to pull the Trigger and Sear prints apart. The gap between them should only be able to expand between $\frac{1}{4}$ and $\frac{3}{8}$ of an inch.
 Once this is confirmed, cut off the excess elastic and set it aside.



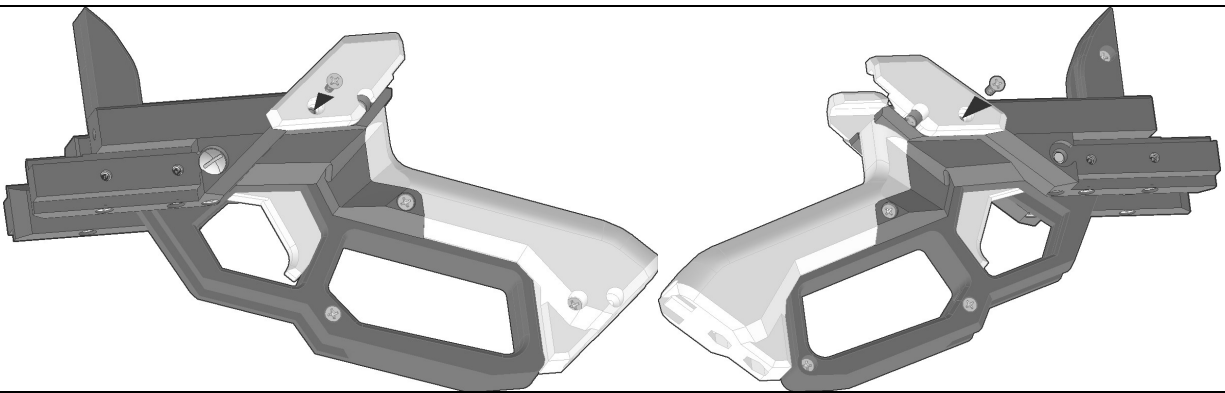
Attach the Sideplate prints to the Grip print using 4-40 screws.



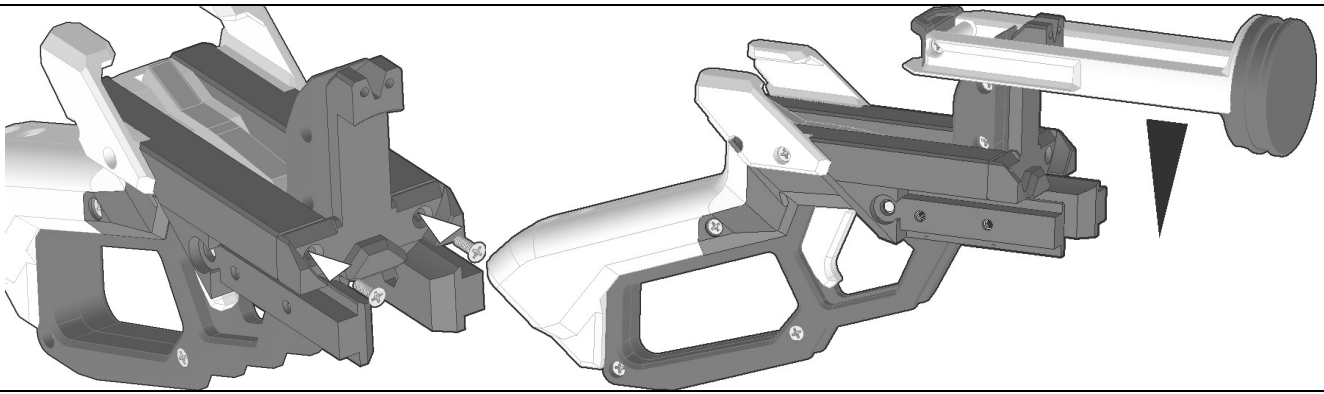
Slide the Lever prints into the grip until the large hole lines up with the large holes in the Trigger and Sideplate prints.



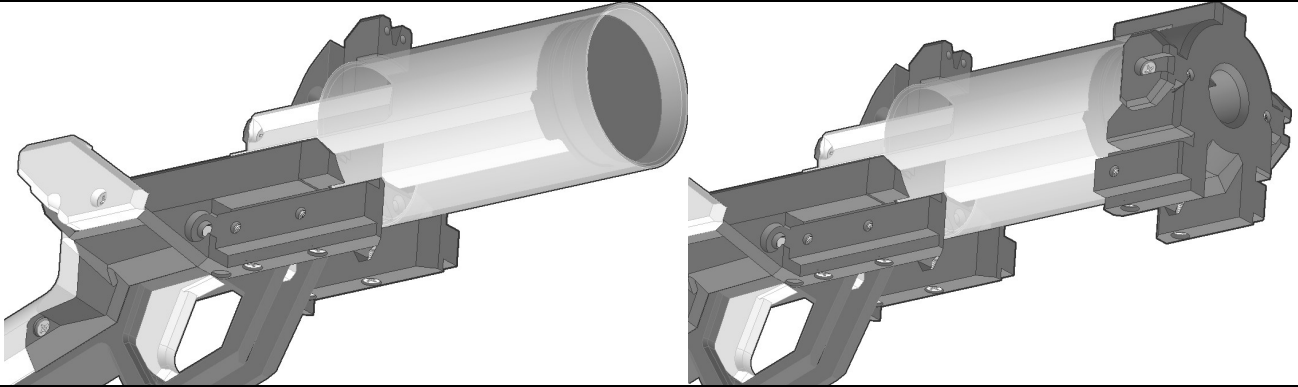
Feed a long 10-32 screw in through the Sideplates, Lever, and Trigger prints.
Drive a 4-40 screw in through the perpendicular hole in the Sideplate print until it clamps down onto the long 10-32 screw.



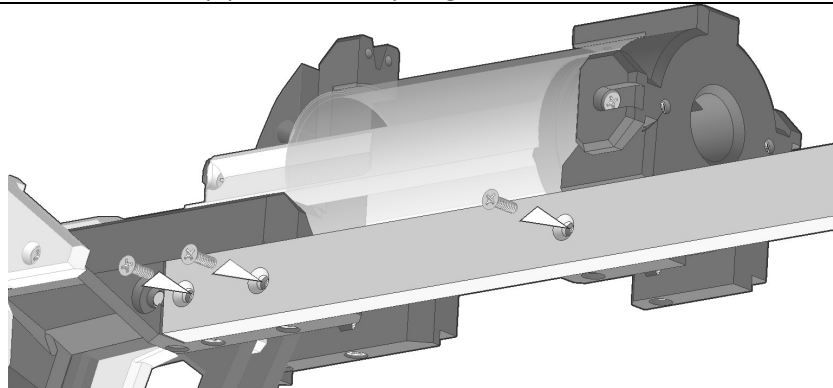
Use a 4-40 screw to attach the Wing prints to each Sideplate.



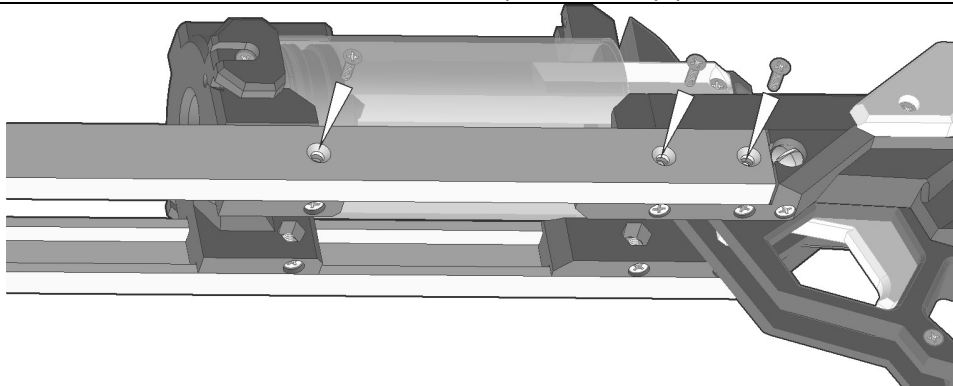
Attach the Center print to the front of the Sideplate prints using two 4-40 screws.
Slide the Plunger assembly down over the grip assembly.



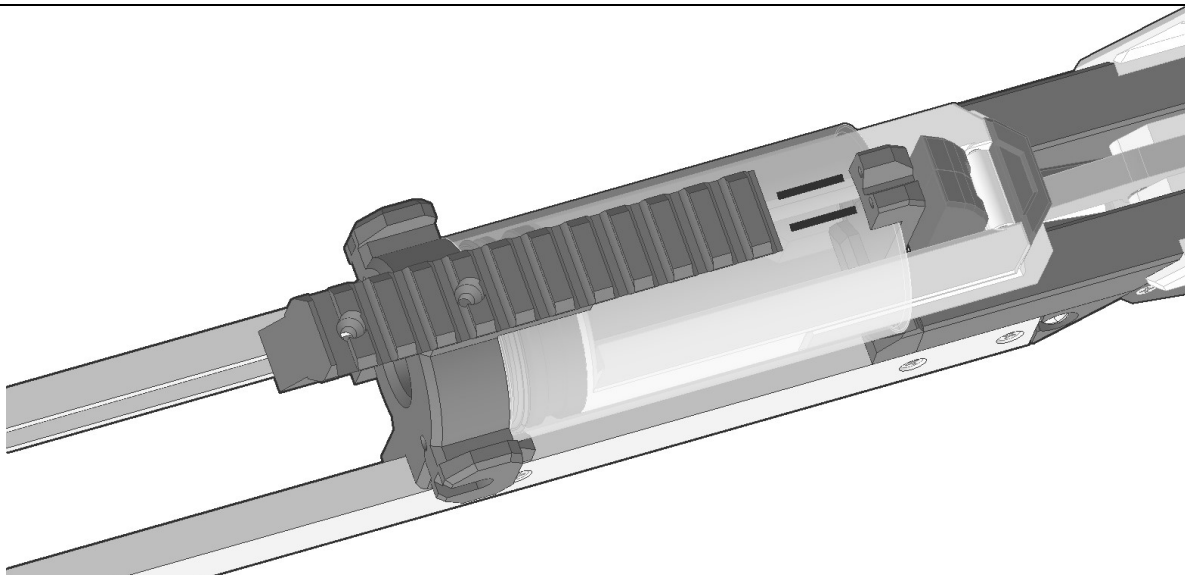
Slide the plunger tube onto the end of the Plunger.
Force the Cap print into the plunger tube until it bottoms out.



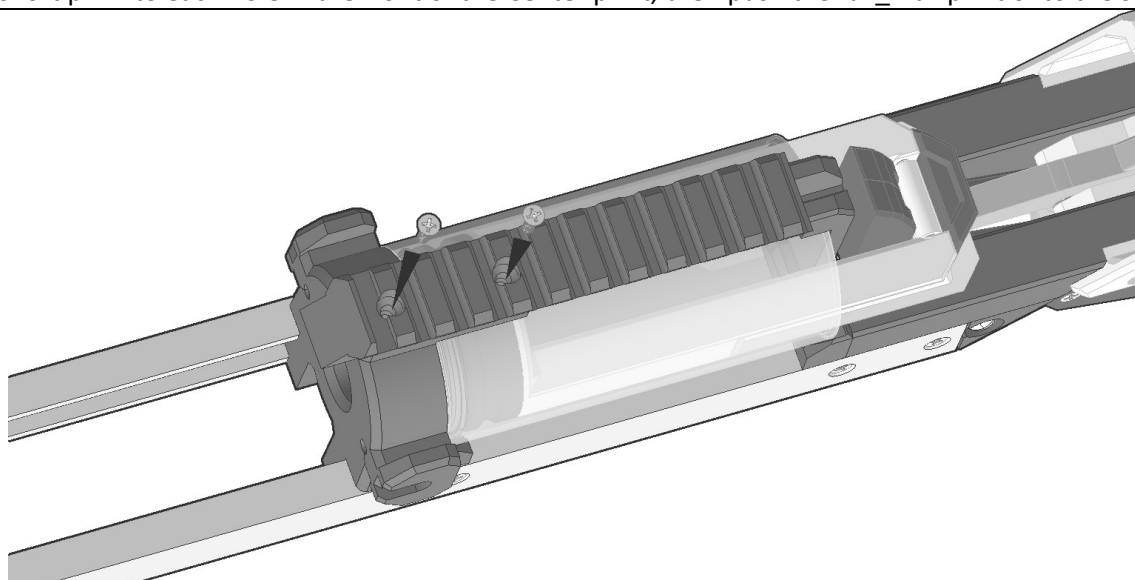
Line up the holes in one of the U-channels with the Sideplate and Cap prints, and secure it with 4-40 screws.



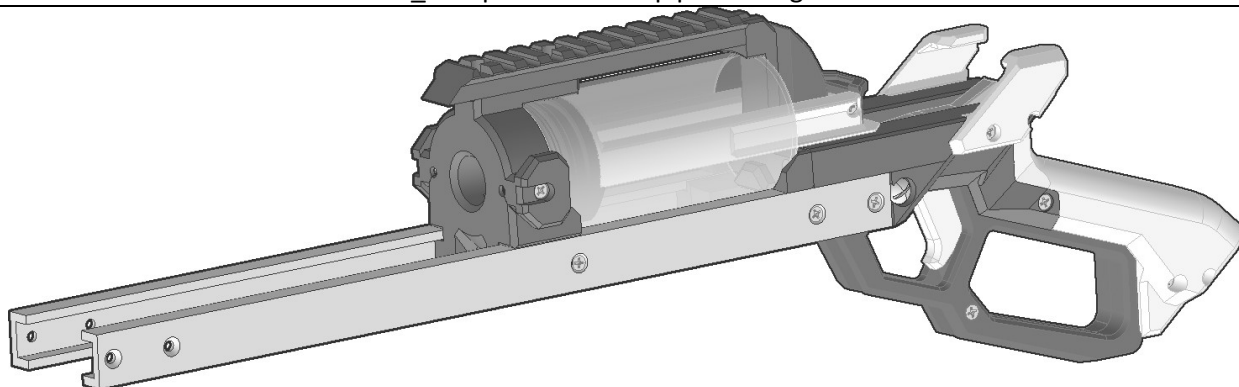
Repeat for the remaining U-channel on the opposite side.



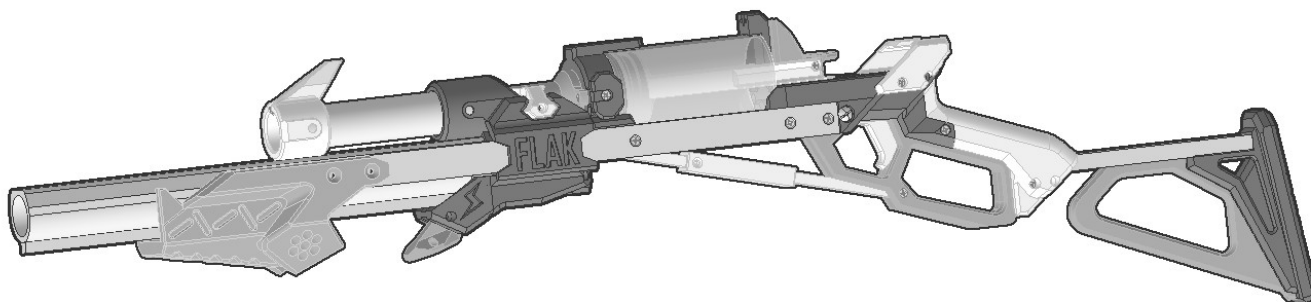
Insert a short pin into each hole in the front of the Center print, then push the rail_max print onto the short pins.



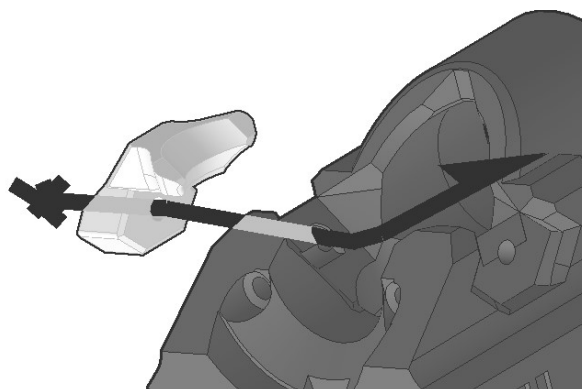
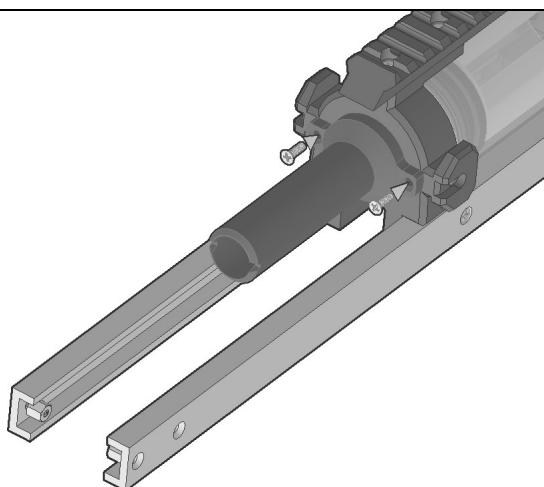
Secure the rail_max print to the Cap print using two 4-40 screws.



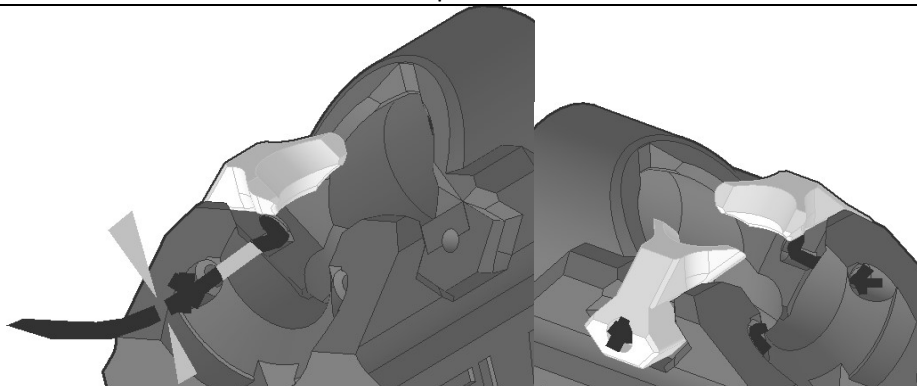
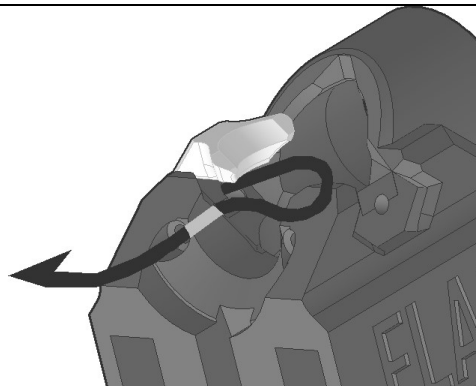
The Rear Half Assembly is complete. Now onto the various ammo type front ends.



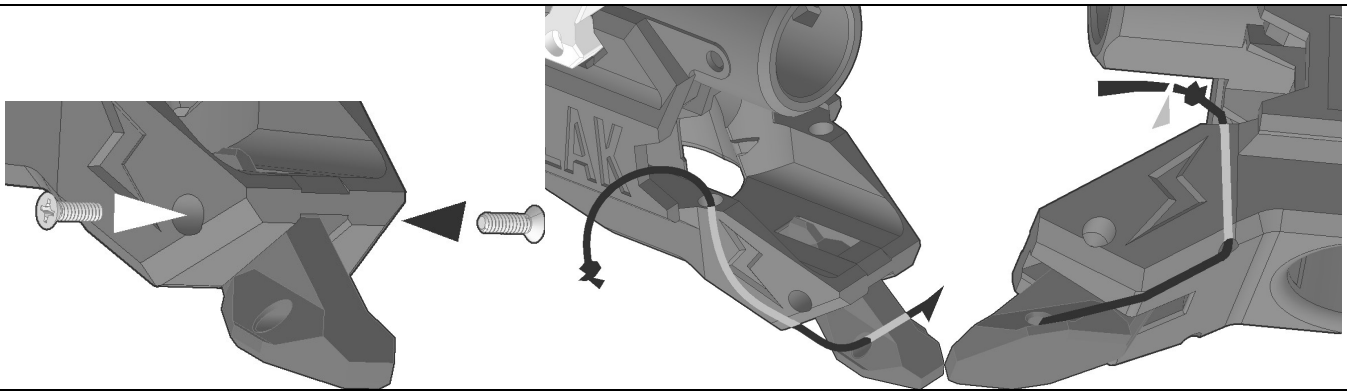
Inline RIVAL Magazine Assembly



Attach the RamR Print to the front of the Cap print using two 4-40 screws.
Tie a knot at the end of the 3/32" elastic, then feed the free end through the ClawR print and into the hole in the side of the CartRT print.



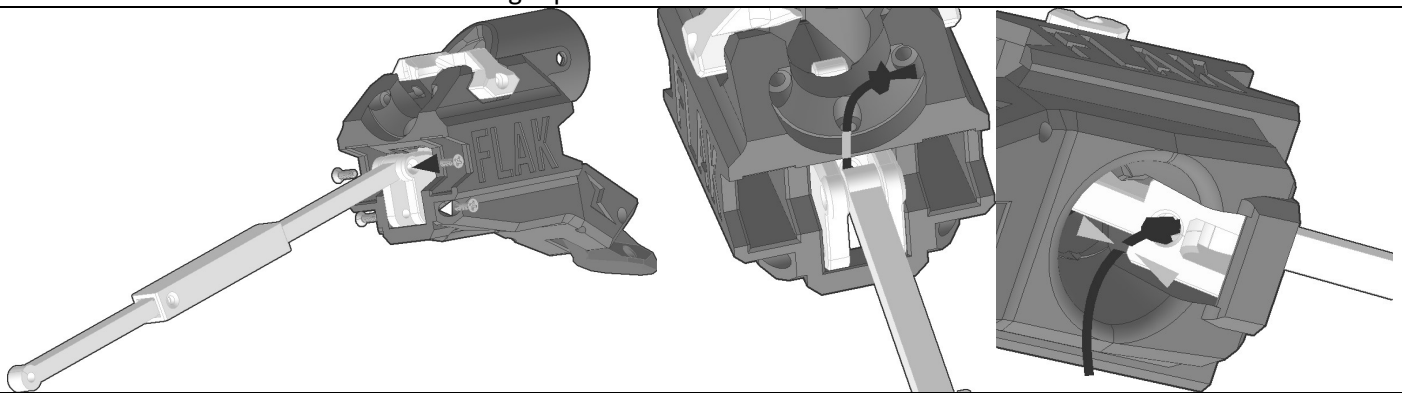
Then feed the free end in the hole perpendicular to that inside hole and out the back of the CartRT print.
Pull the cord until it's taught, then tie a knot as close to the CartRT print as possible. Use scissors to trim off the excess.
Repeat to install the second ClawRT print on the right side of the CartRT print.



Line up the hole in the ReleaseR print with the hole in the front of the CartRT print, then drive a 4-40 screw in from each side. The ReleaseR print should rotate freely.

Knot the end of a length of 3/32" elastic and feed it in through the hole in the top of the CartRT print, then in through the hole in the side of the ReleaseR print.

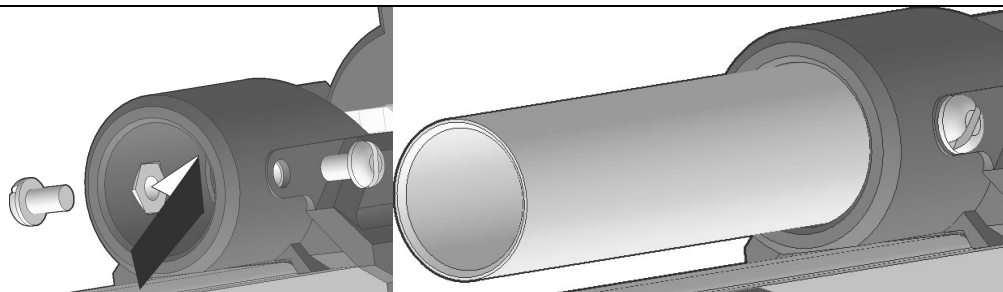
Repeat on the opposite side, then pull taught and tie a knot very close to the hole. Trim off the excess and let the knot get pulled into the counterbore.



Slide the ElevatorRT print into the back of the CartRT print until the holes in both line up. Drive a 4-40 screw in from each side. The Elevator RT print should rotate freely. Slide the Linkage assembly into the ElevatorRT print as shown, and drive a 4-40 screw in from each side. The Linkage assembly should rotate freely.

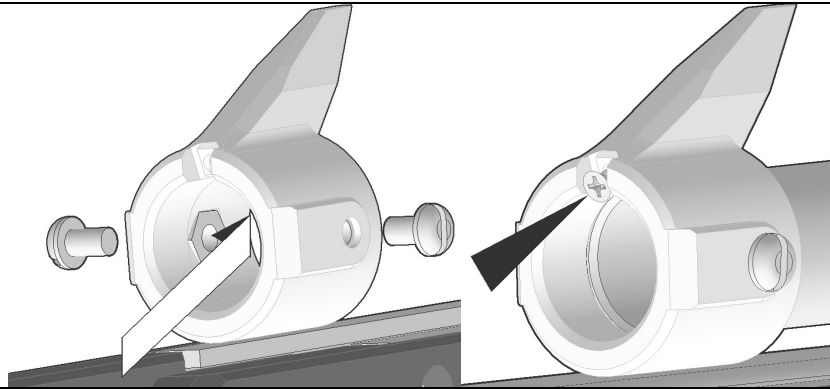
Knot the end of a length of 3/32" elastic and feed it in through the hole in the top of the CartRT print, then through the hole in the top of the ElevatorRT print.

Pull taught on the opposite side and tie a knot very close to the hole. Trim off the excess and let the knot get pulled into the counterbore.



Push a hex nut into the socket inside the front of the CartRT print, then drive a 10-32 screw into it from the outside until the hex nut is pulled to the bottom of the socket. Repeat on the other side.

Back the screws out far enough to allow the barrel to be pushed into the hole in the CartRT print, then drive the screws into the barrel until it is secured.

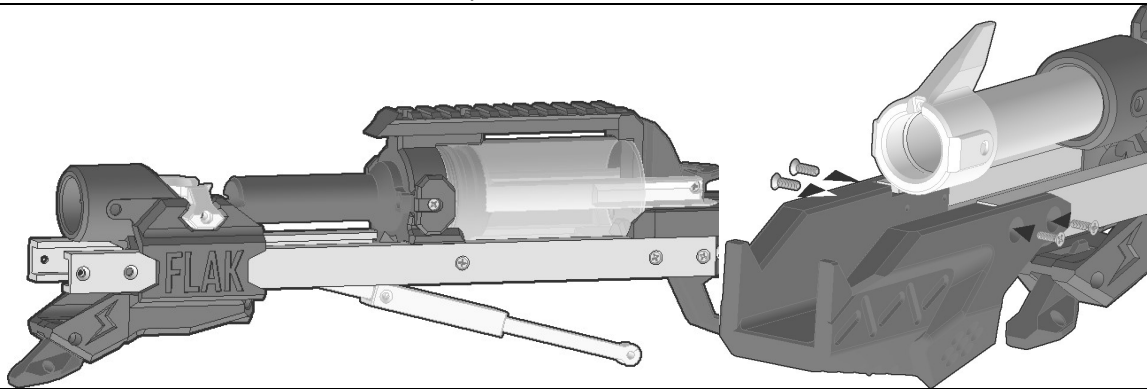


Repeat the above steps with the MuzzRT print, then secure it to the exposed end of the barrel.

Make sure to align the upper sight blade so that it is perfectly vertical.

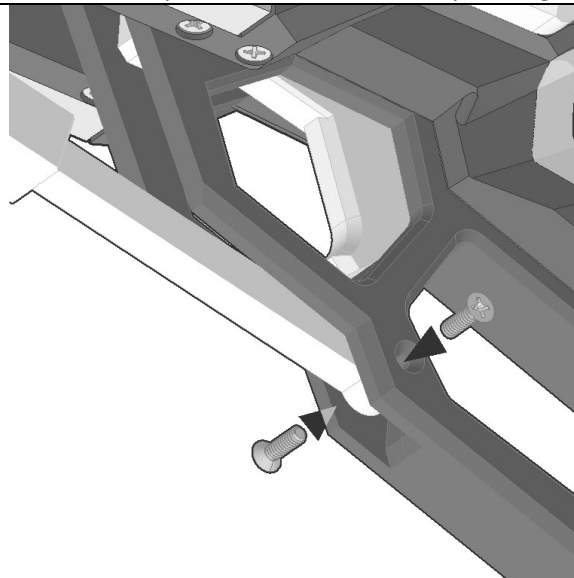
Drive a 4-40 screw into the small hole in the front of the MuzzRT print. This is the adjustable hop-up.

If when testing the blaster later on and the Rival Rounds fired float upwards too much, this screw will need to be tightened further. If the Rival Round fired slope downwards when fired, this screw will need to be loosened.



Slide the finished Inline magwell assembly onto the U-channel pairs on the front of the blaster.

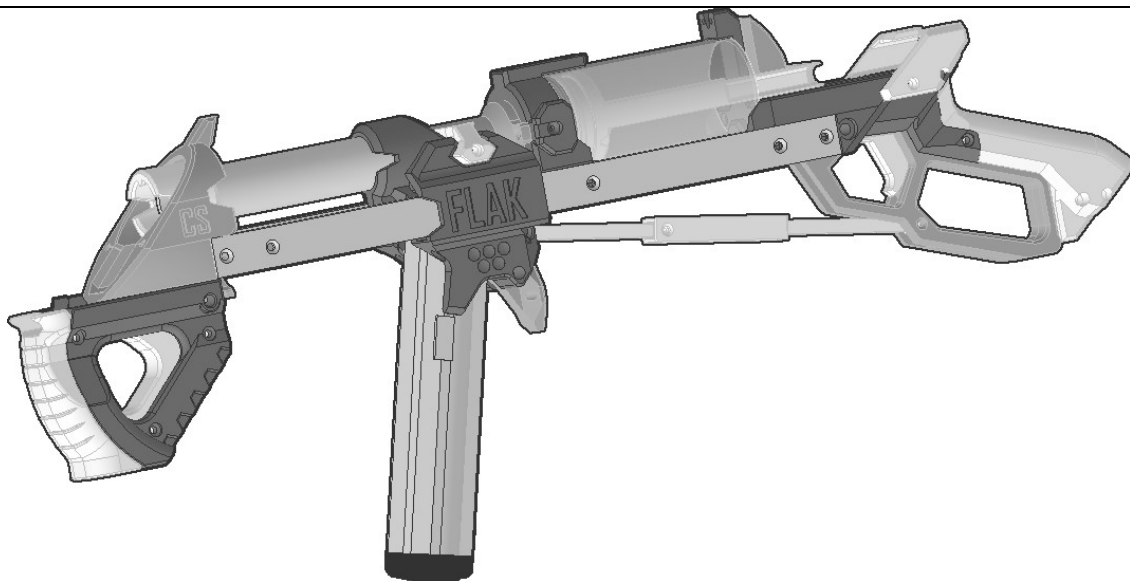
Slide the ForegripRT print onto the u-channel pair ends, then secure by driving two 4-40 screws in from each side.



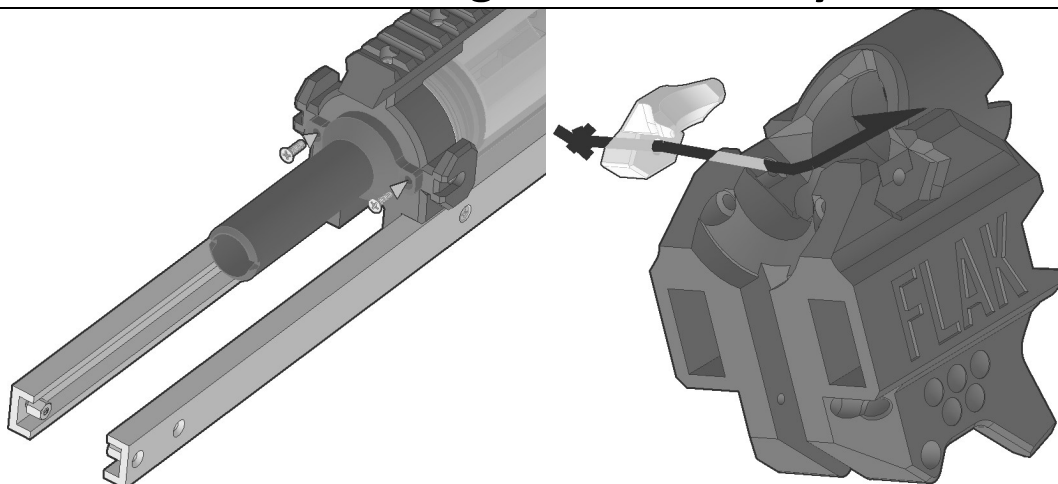
Line up the hole in the Linkage assembly with the holes in the slot in the front of the Lever Assembly.

Drive a 4-40 screw in from both sides until they push into the hole in the Linkage assembly, retaining it. The Linkage assembly print should still be able to rotate after both screws are installed.

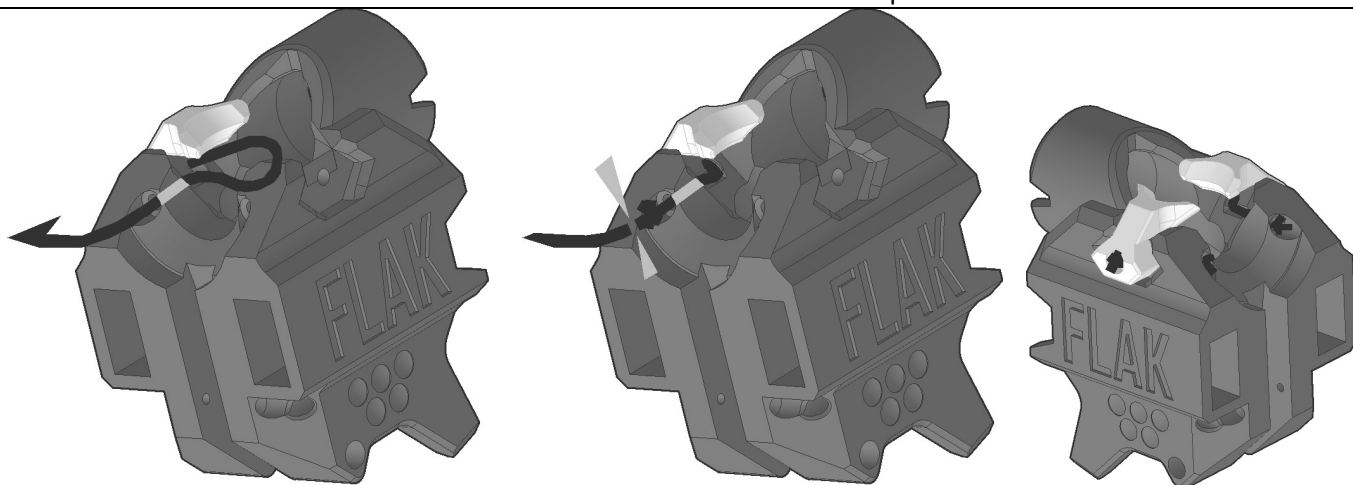
Inline Rival Mag assembly is Complete. Simply insert a magazine through the front of the blaster below the barrel. You can load rival rounds into the mag through the port in the bottom of the magwell when the breech is closed.



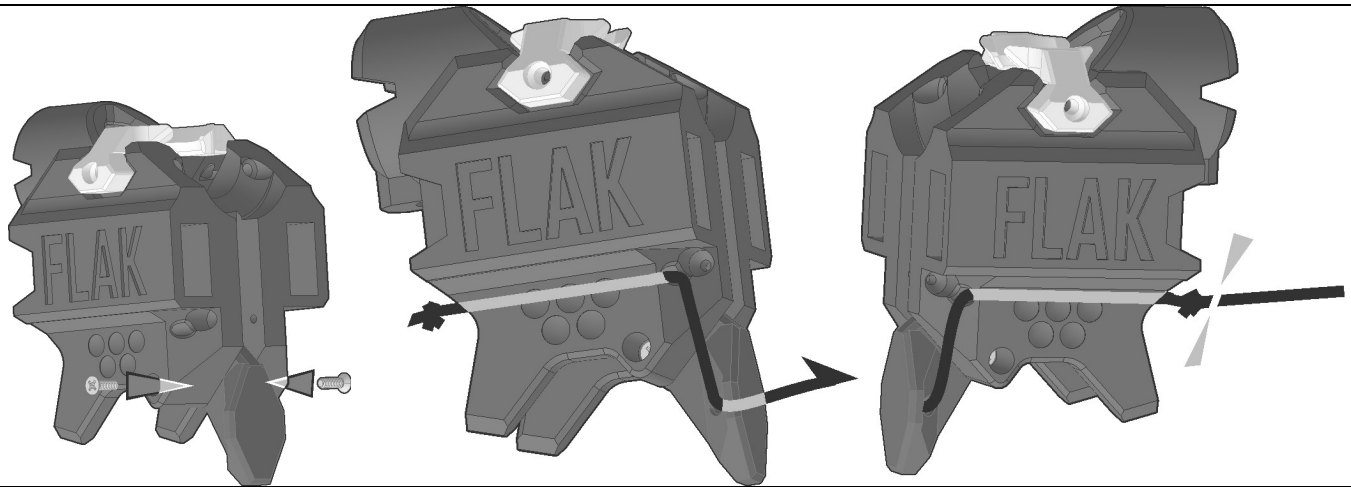
RIVAL Magazine Assembly



Attach the RamR Print to the front of the Cap print using two 4-40 screws.
Tie a knot at the end of the 3/32" elastic, then feed the free end through the ClawR print and into the hole in the side of the CartR print.



Then feed the free end in the hole perpendicular to that inside hole and out the back of the CartR print.
Pull the cord until it's taught, then tie a knot as close to the CartR print as possible. Use scissors to trim off the excess.
Repeat to install the second ClawR print on the right side of the CartR print.



Line up the hole in the ReleaseR print with the holes in the slot in the bottom of the CartR print. Drive a 4-40 screw in from both sides until they push into the hole in the ReleaseR print, retaining it. The ReleaseR print should still be able to rotate after both screws are installed.

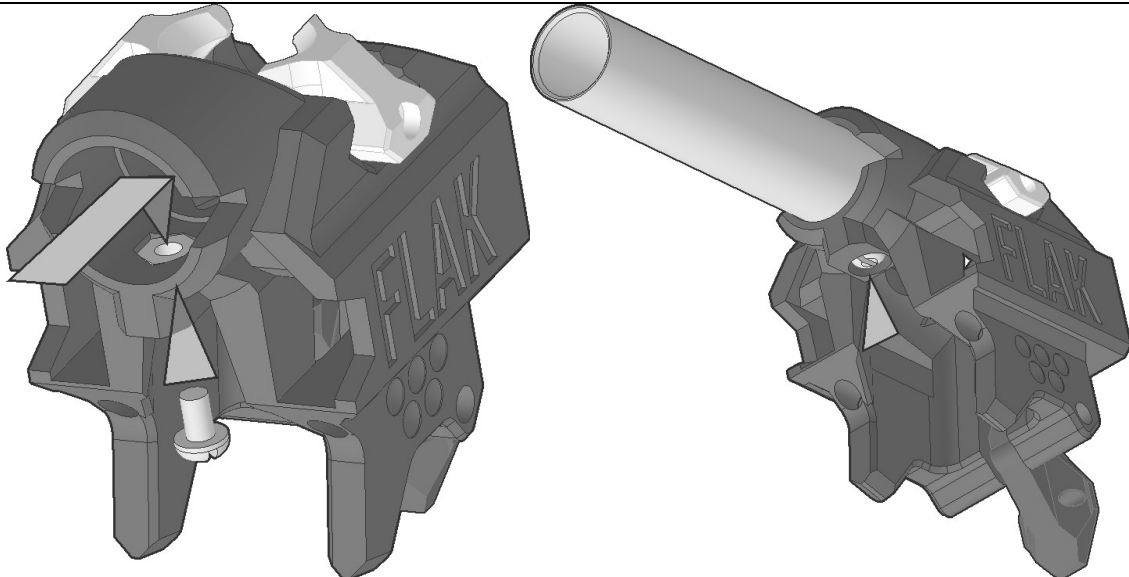
Tie a knot on the end of the 3/32" elastic cord, then feed it through the small hole in the front of the CartR print.

Stretching it out the back and down, then through the hole in the side of the ReleaseR print.

Pull it upwards and into the hole in the back of the CartR print on the opposite side, then out through the front.

Pull the elastic taught, making sure to pull of any available slack.

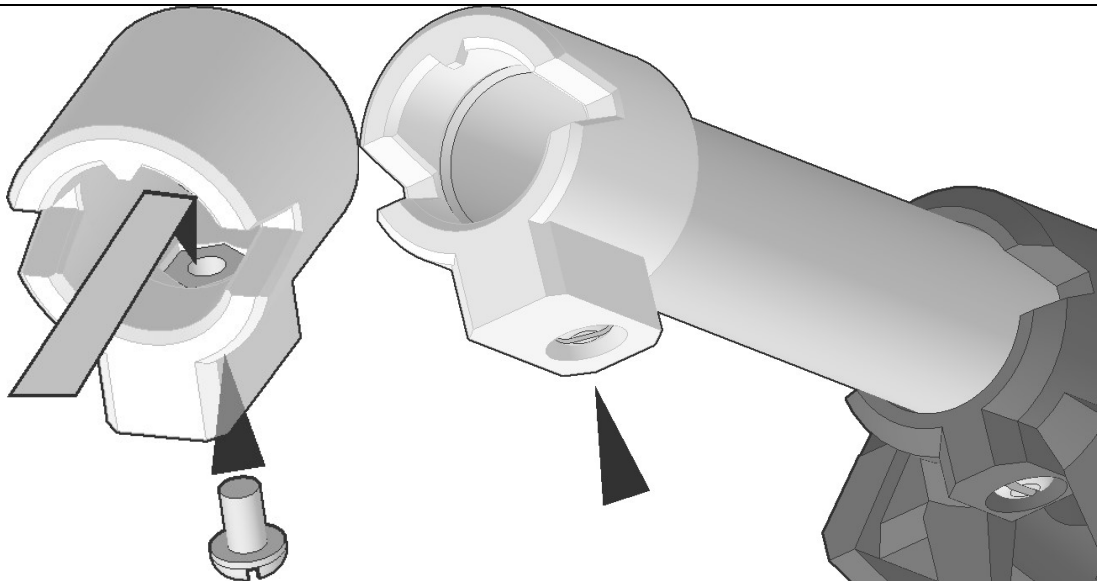
Then tie a knot as close to the CartR print as you can, then trim off the excess. Both knotted ends can be put into the widened portion of the holes in the CartR print to hide them.



Add a Hex nut to the socket inside the barrel hole of the CartR print, then drive a 10-32 screw into it from the hole underneath until it pulls it tightly into the socket.

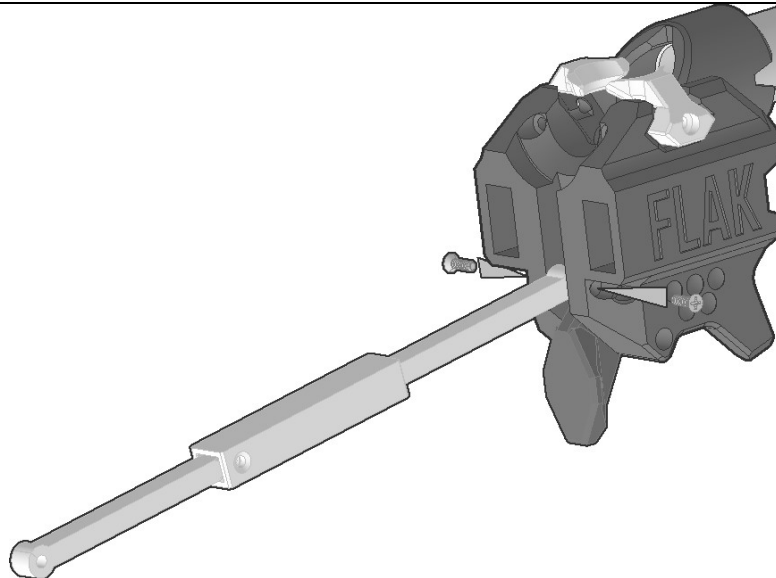
Back the screw out enough to allow the barrel to be inserted and bottomed out past the screw.

Tighten the screw again until it clamps down onto the barrel.



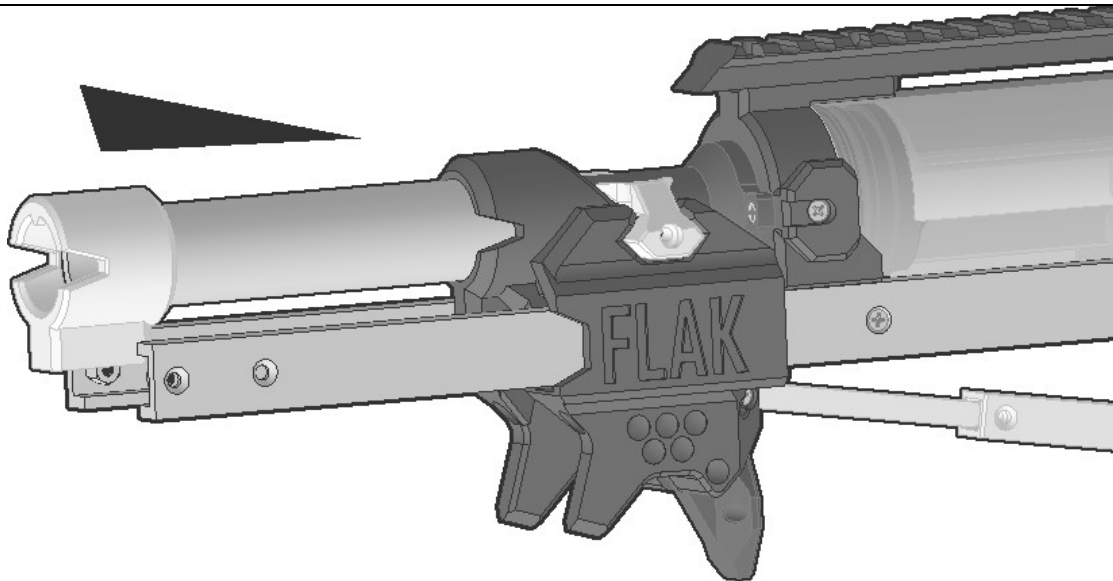
Add a Hex nut to the socket inside the barrel hole of the MuzzR print, then drive a 10-32 screw into it from the hole underneath until it pulls it tightly into the socket.

Back the screw out enough to allow the barrel to be inserted and bottomed out past the screw.
Tighten the screw again until it clamps down onto the barrel.

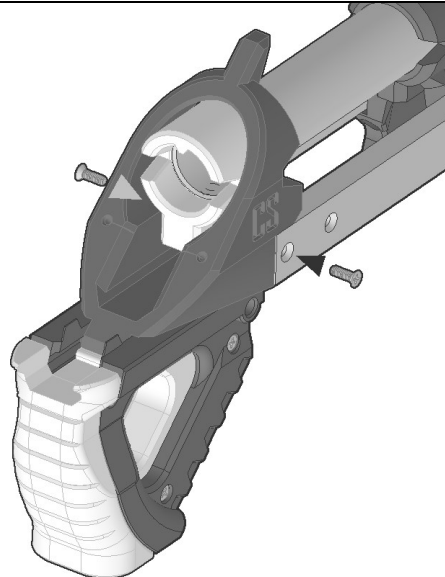
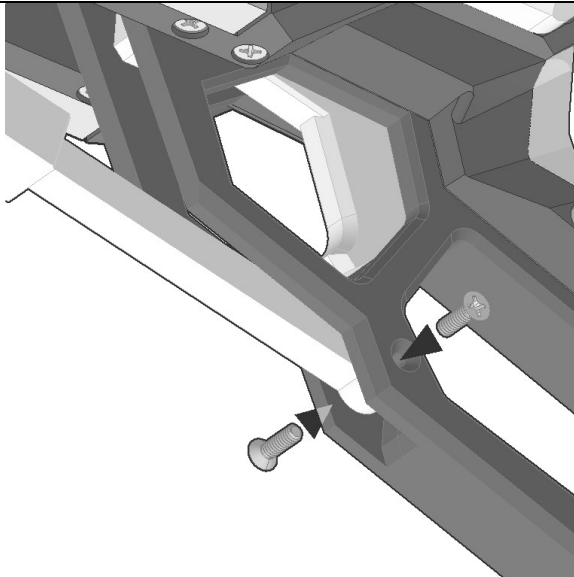


Line up the hole in the Linkage assembly with the holes in the slot in the back of the CartR print.

Drive a 4-40 screw in from both sides until they push into the hole in the Linkage assembly, retaining it. The Linkage assembly print should still be able to rotate after both screws are installed.

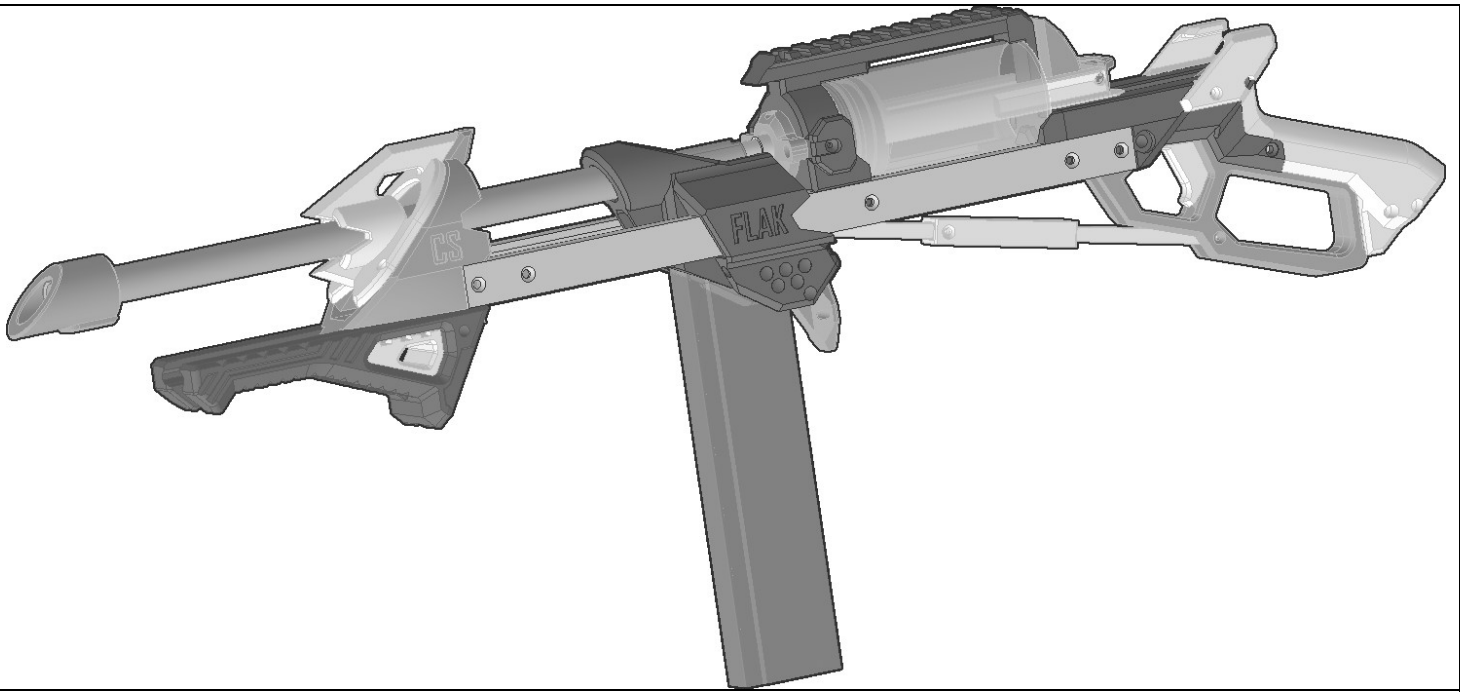


Slide the Rival Assembly onto the U-channel pair.

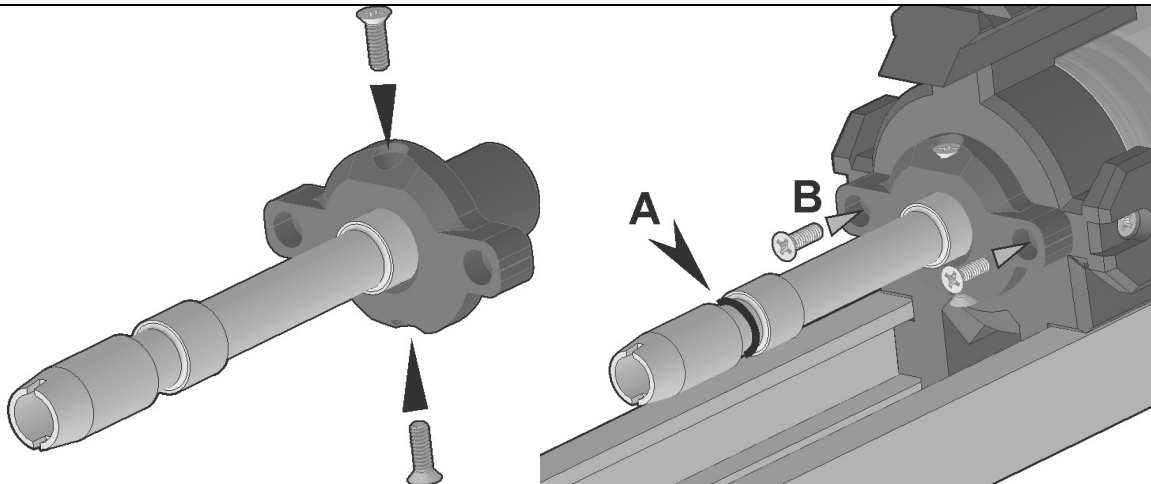


Line up the hole in the Linkage assembly with the holes in the slot in the front of the Lever Assembly.
Drive a 4-40 screw in from both sides until they push into the hole in the Linkage assembly, retaining it. The Linkage assembly print should still be able to rotate after both screws are installed.

Slide the Muzzle into the open end of the U-Channels and secure it on each side with a 4-40 screw.



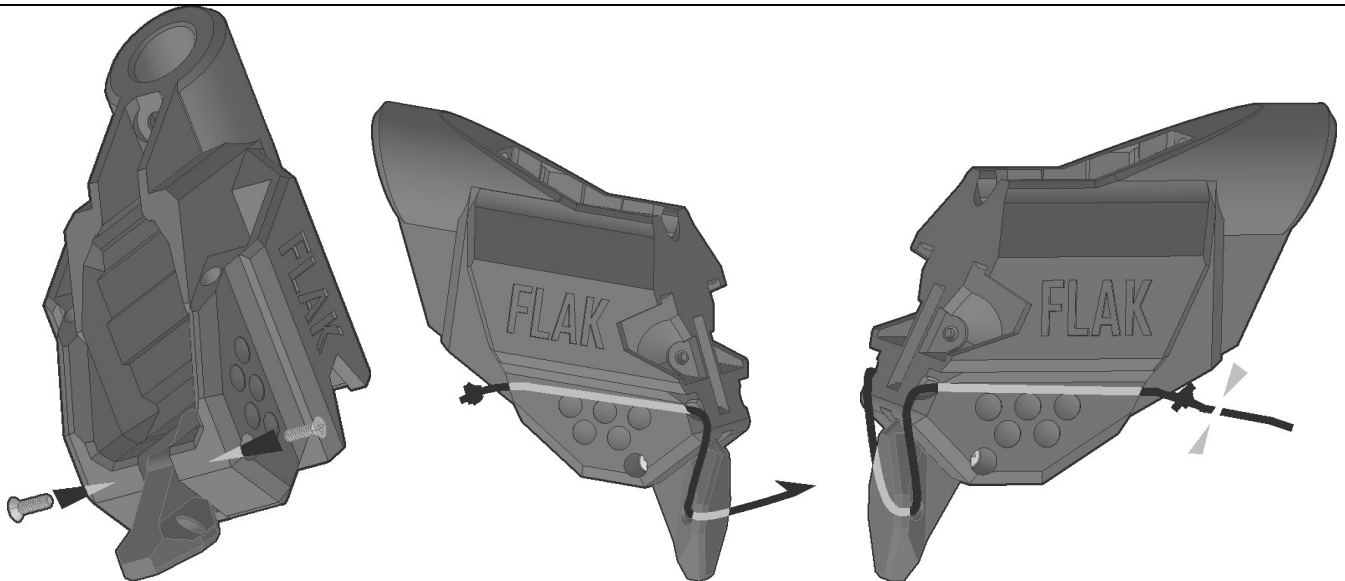
TALON Magazine Assembly



Press the Ramrod core into the RamD print. Drive a 4-40 screw in from each side to retain it. These can be adjusted later to correct for vertical alignment relative to the barrel.

Add an O12 o-ring to the undercut on the ramrod.

Attach the Ramrod assembly to the front of the Cap print using two 4-40 screws.



Line up the hole in the ReleasedD print with the holes in the slot in the bottom of the CartD print. Drive a 4-40 screw in from both sides until they push into the hole in the ReleasedD print, retaining it. The ReleasedD print should still be able to rotate after both screws are installed.

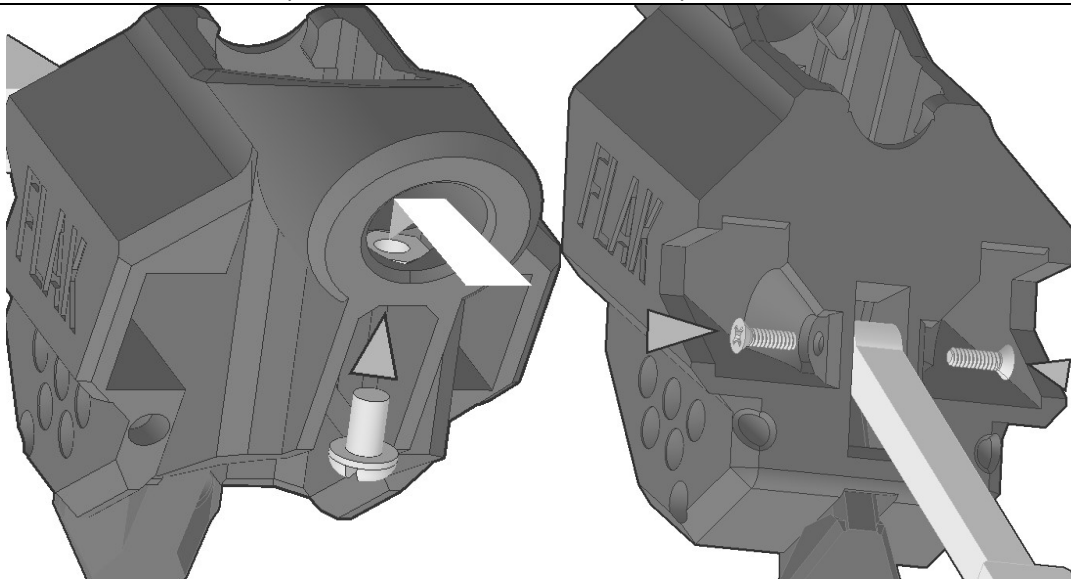
Tie a knot on the end of the 3/32" elastic cord, then feed it through the small hole in the front of the CartD print.

Stretching it out the back and down, then through the hole in the side of the ReleasedD print.

Pull it upwards and into the hole in the back of the CartD print on the opposite side, then out through the front.

Pull the elastic taught, making sure to pull of any available slack.

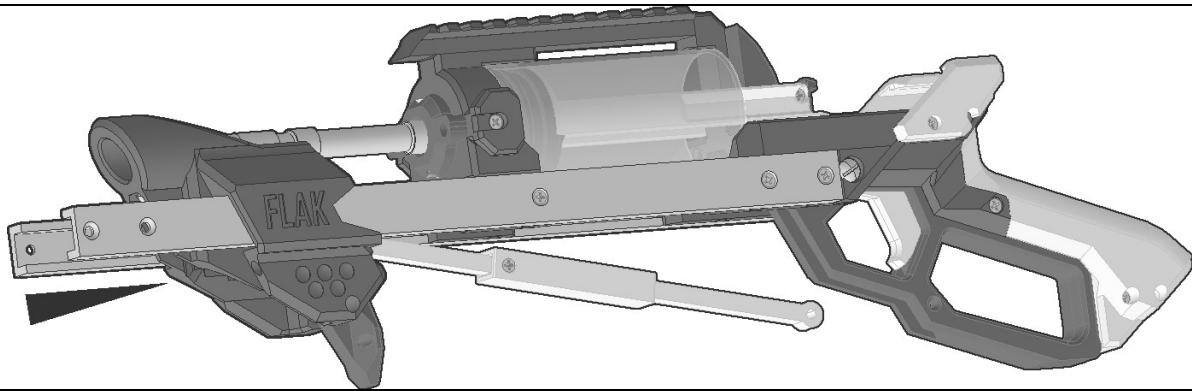
Then tie a knot as close to the CartD print as you can, then trim off the excess. Both knotted ends can be put into the widened portion of the holes in the CartD print to hide them.



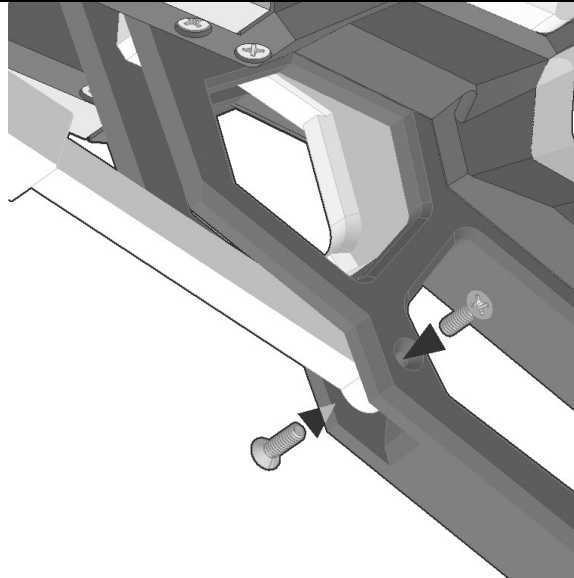
Add a Hex nut to the socket inside the barrel hole of the CartR print, then drive a 10-32 screw into it from the hole underneath until it pulls it tightly into the socket.

Line up the hole in the Linkage assembly with the holes in the slot in the back of the CartR print.

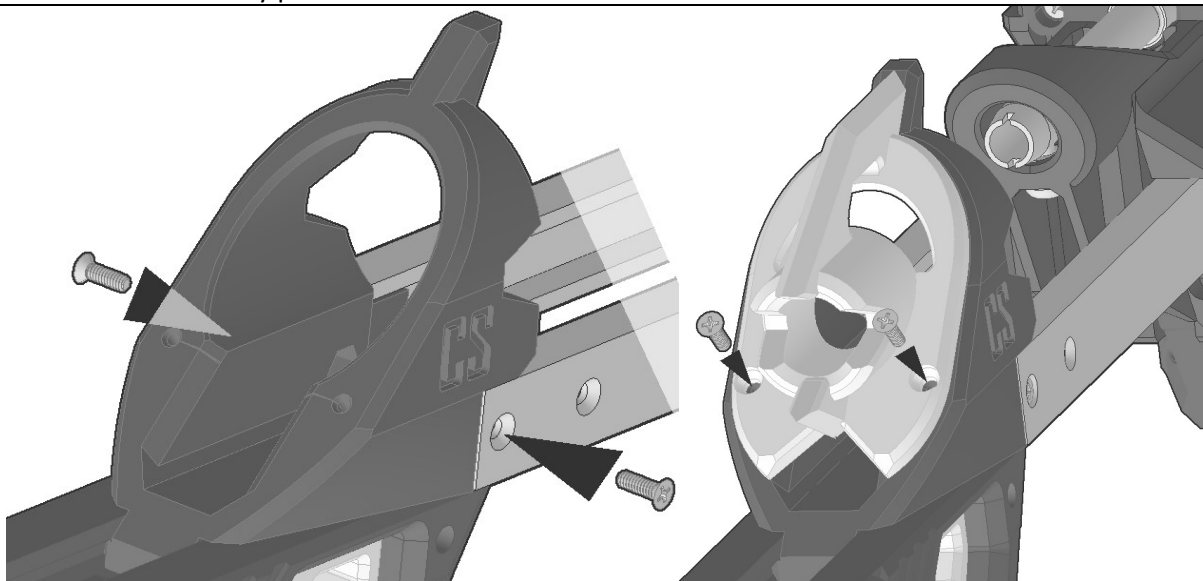
Drive a 4-40 screw in from both sides until they push into the hole in the Linkage assembly, retaining it. The Linkage assembly print should still be able to rotate after both screws are installed.



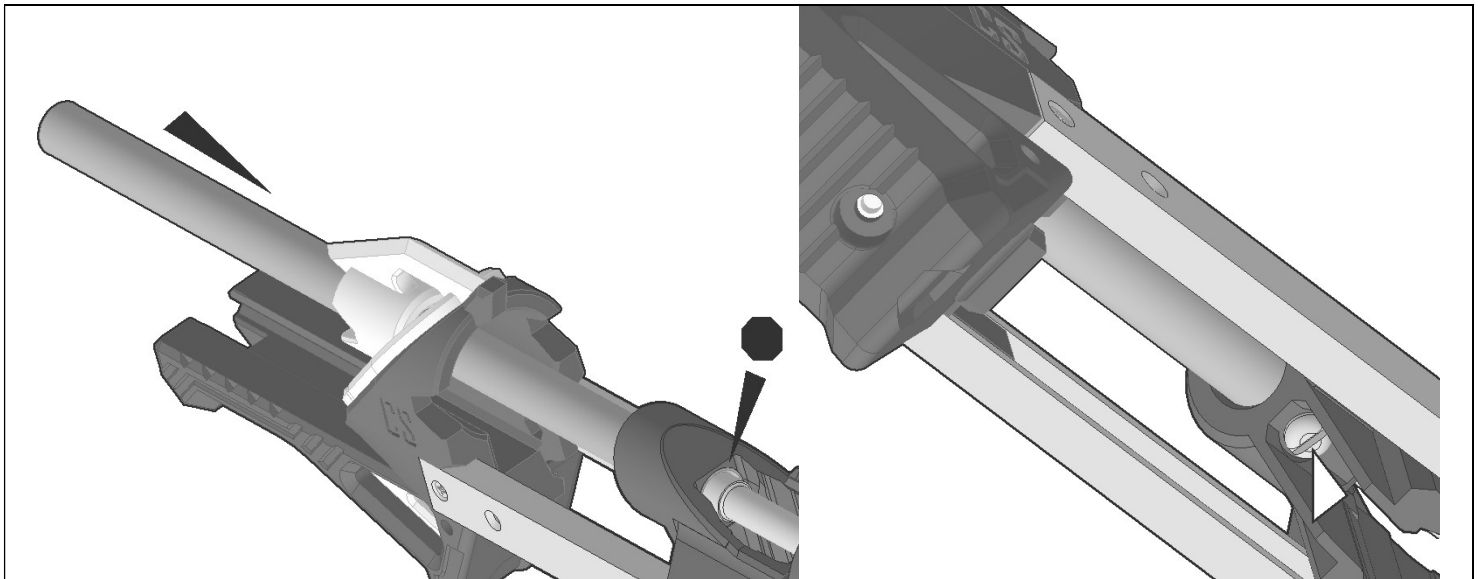
Slide the Talon Mag assembly onto the U-channels.



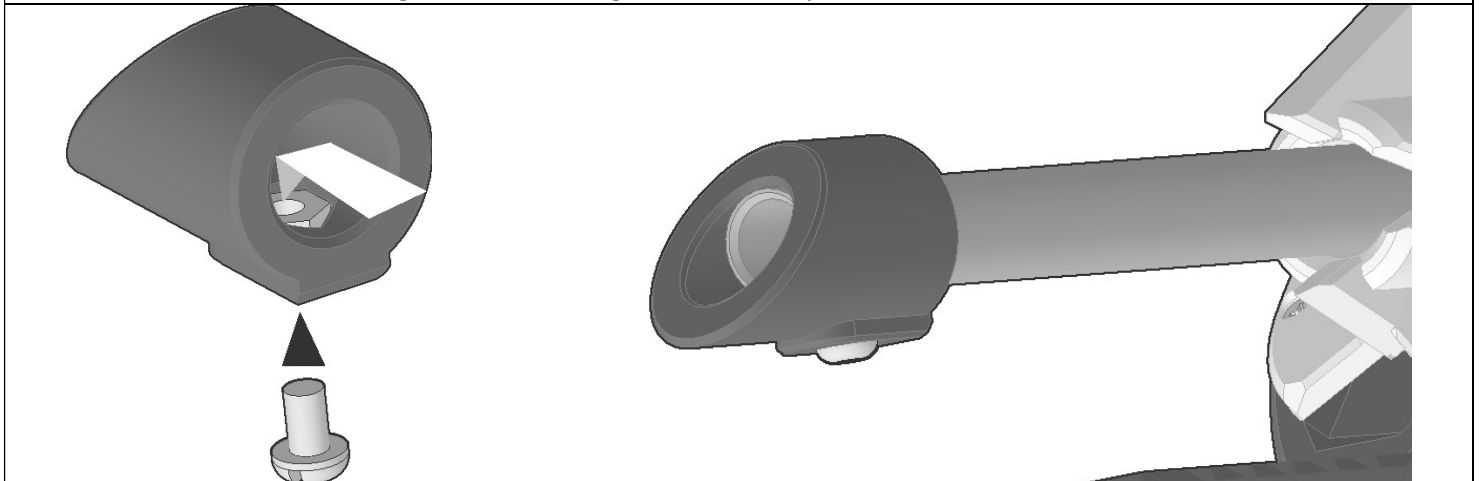
Line up the hole in the Linkage assembly with the holes in the slot in the front of the Lever Assembly. Drive a 4-40 screw in from both sides until they push into the hole in the Linkage assembly, retaining it. The Linkage assembly print should still be able to rotate after both screws are installed.



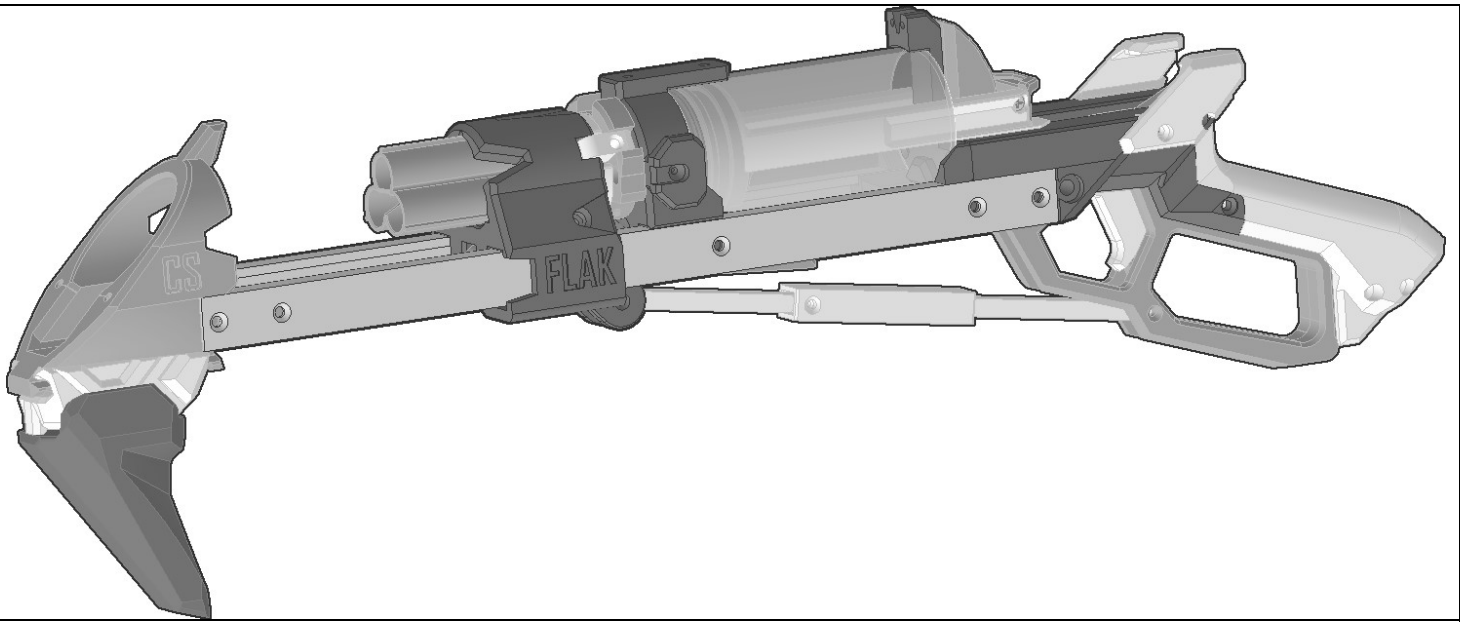
Slide the Muzzle into the open end of the U-Channels and secure it on each side with a 4-40 screw. Attach the LipD print to the front of the Muzzle print using two 4-40 screws.



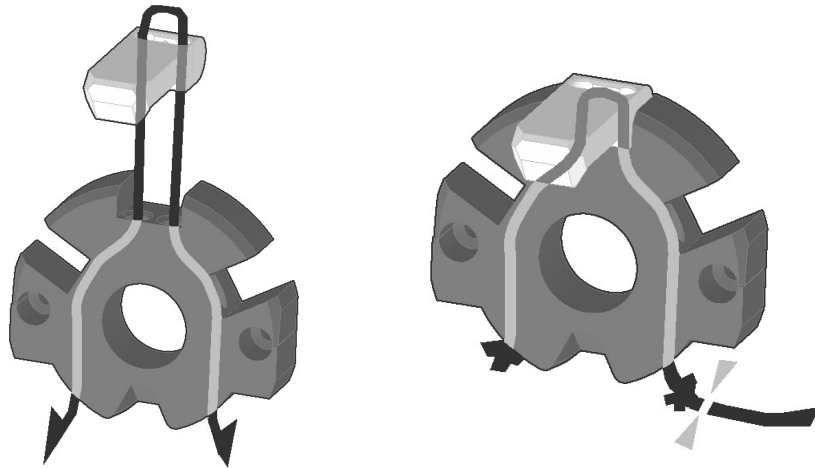
Slide the barrel in through the LipD print and then into the front of the CartD print.
 Back the screw in the hex nut at the front of the CartD print out enough to allow the barrel to be inserted until flush with the inside surface of the magazine well.
 Tighten the screw again until it clamps down onto the barrel.



Add a Hex nut to the socket inside the barrel hole of the MuzzD print, then drive a 10-32 screw into it from the hole underneath until it pulls it tightly into the socket.
 Back the screw out enough to allow the barrel to be inserted and bottomed out past the screw.
 Tighten the screw again until it clamps down onto the barrel.



Shell Assembly

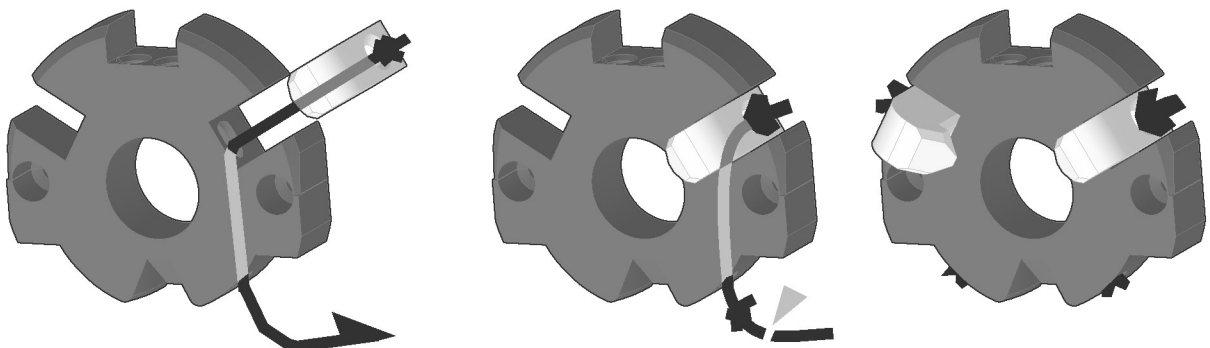


For the Trilogy shells feed each free end of some 3/32" elastic cord through the two holes in the ExtractorT print, then into the two matching holes in the RamS print. Feed them through until they come out the bottom side of the print.

Tie a knot at one of the free ends, then pull up all of the slide from the remaining free end.

Pull the elastic taught, making sure to feed out as much slack as you can.

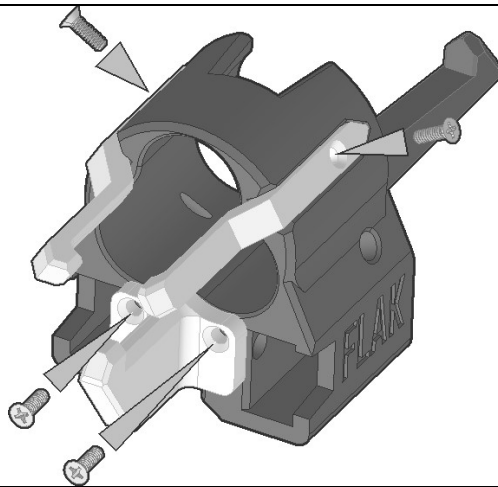
Tie a knot as close to the RamS print as you can manage, then use scissors to trim off the excess.



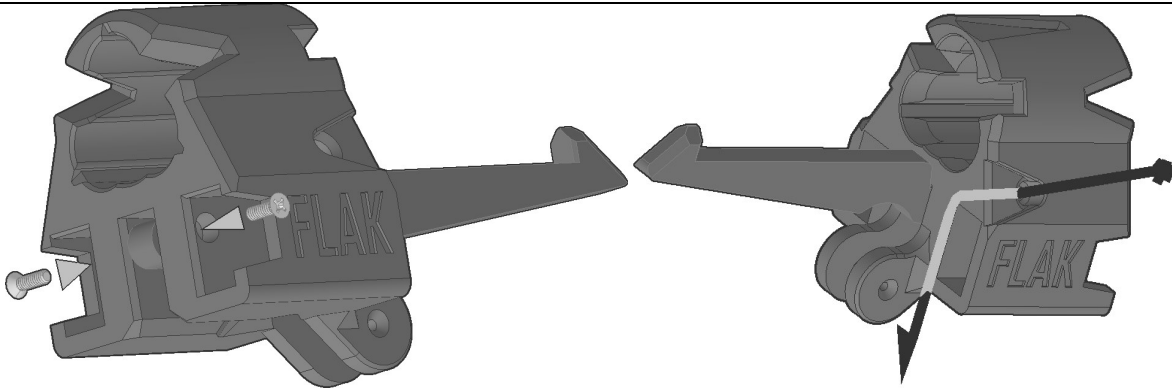
For the Sledgefire shells tie the end of a 3/32" elastic cord and then fish it through the ExtractorS print and into the corresponding hole in the RamS print until it comes out the hole in the bottom of the print.

Pull the elastic taught then tie a knot as close to the RamS print as you can manage, then use scissors to trim off the excess.

Repeat for the opposite side.

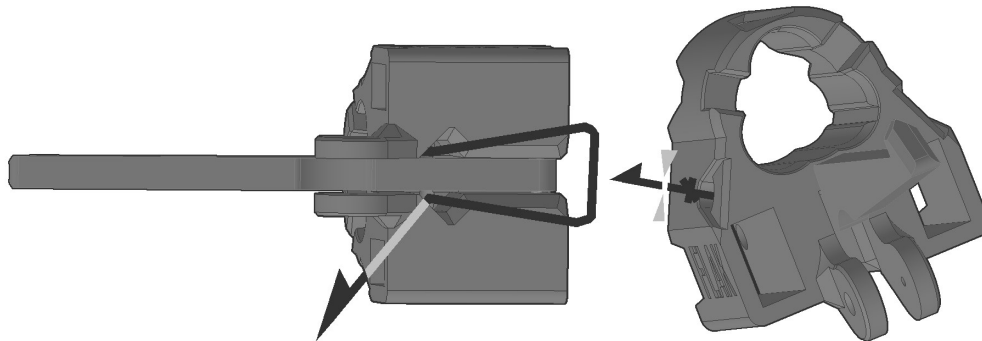


For the Trilogy sell you will need to use four 4-40 screws to attach the Hook and Hook2 prints to the outside of the CartT print. Otherwise the rest of the steps are the same.



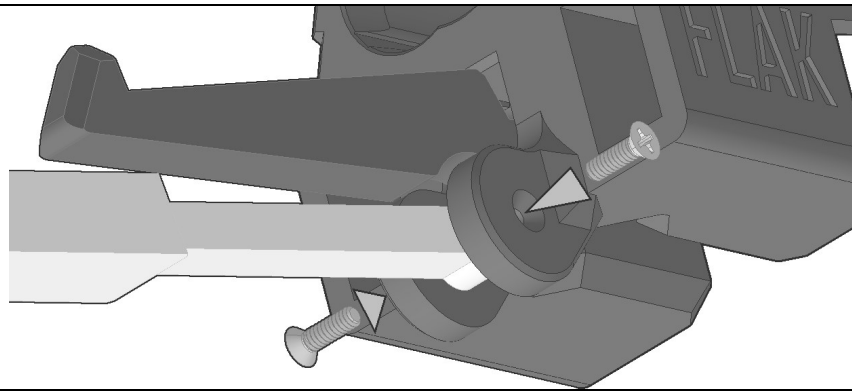
Line up the hole in the EjectorS print with the holes in the Cart print and drive a 4-40 screw in from each side. The EjectorS print should rotate freely after the screws are bottomed out.

Tie a knot near the end of a 3/32" elastic cord, then fish the free end through the hole in the side of the Cart print

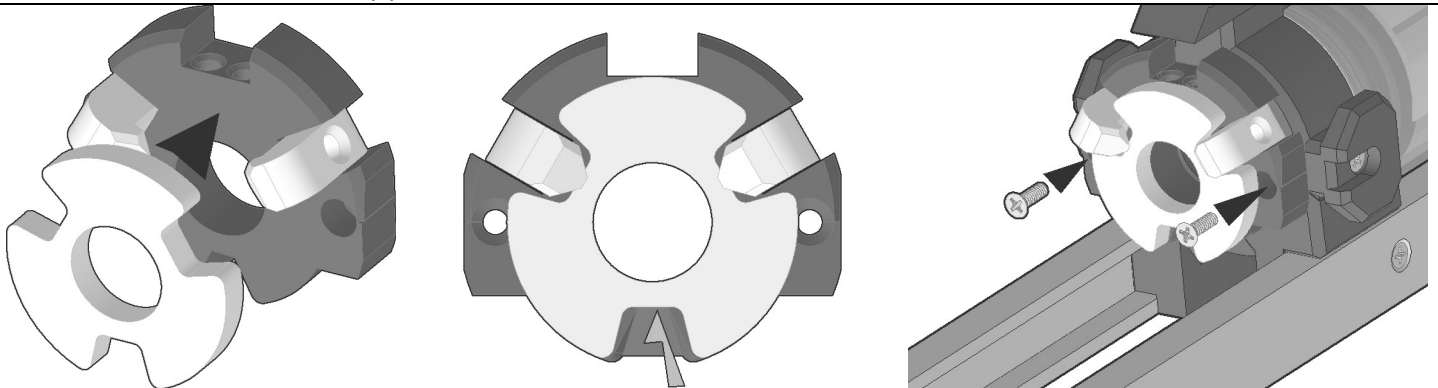


Double-back the elastic over the EjectorS print and into the hole on the opposite side. Feed the elastic through until it comes out the side of the Cart print.

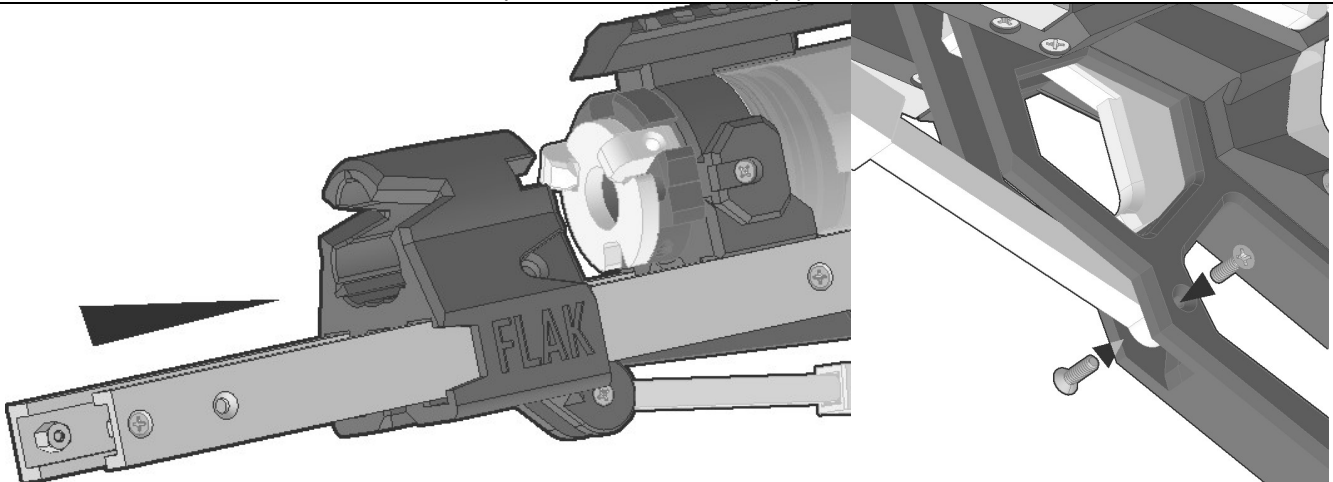
Pull the elastic taught then tie a knot as close to the Cart print as you can manage, then use scissors to trim off the excess.



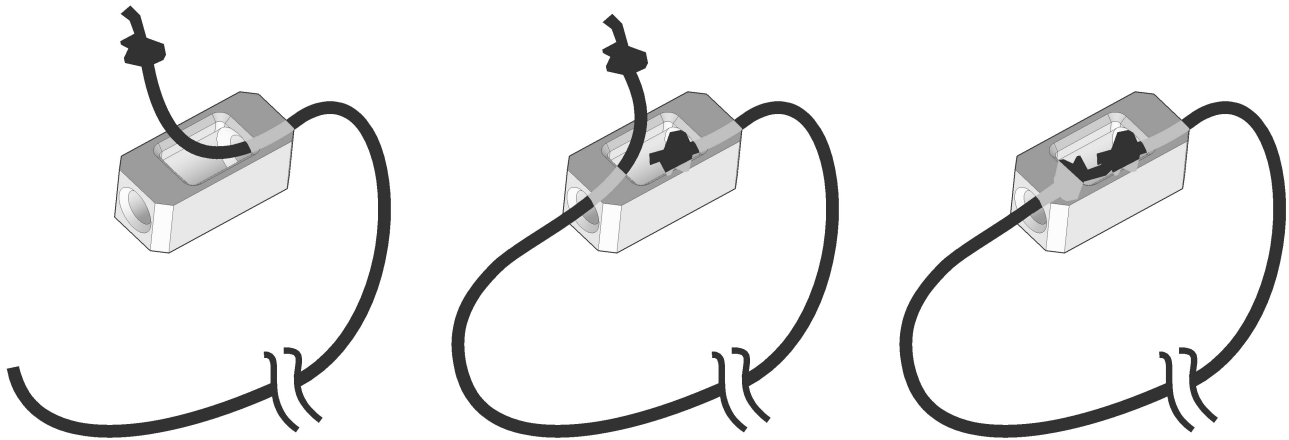
Line up the hole in the Linkage assembly with the holes in the slot in the back of the CartR print. Drive a 4-40 screw in from both sides until they push into the hole in the Linkage assembly, retaining it. The Linkage assembly print should still be able to rotate after both screws are installed.



Peel the protective film off the back of the Shell Gasket foam and adhere it to the front of the Ram assembly, making sure to line it up as well as you can with the center hole and the ramp at the bottom of the print where indicated. Attach the Ram assembly to the front of the Cap print with two 4-40 screws.



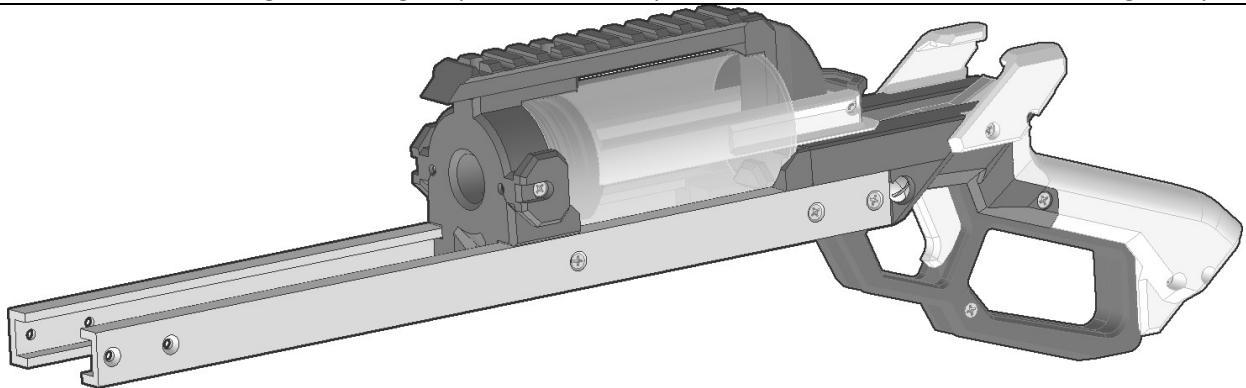
Slide the Cart onto the U-channels. Line up the hole in the Linkage assembly with the holes in the slot in the front of the Lever Assembly. Drive a 4-40 screw in from both sides until they push into the hole in the Linkage assembly, retaining it. The Linkage assembly print should still be able to rotate after both screws are installed.



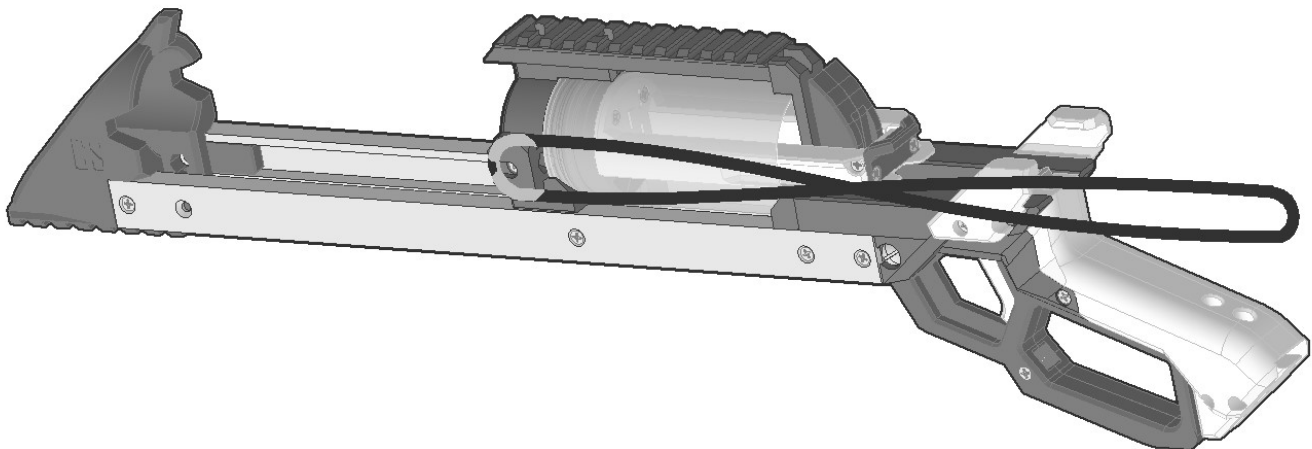
Take one of the 1/8" diameter x 28" length elastic cords and tie a granny knot near the end and pull the knot as tight as possible. Feed the free end in through the slot in the middle of a "Cordpler" print, then pull the knot inside. Loop the free end back into the Cordpler print from the opposite side and out the slot. Tie a granny knot near the free end. Pull the knot as tight as possible. Then pull it into the slot until backed against the inside of the hole.

Repeat the above steps with the remaining three cords and Cordpler prints.

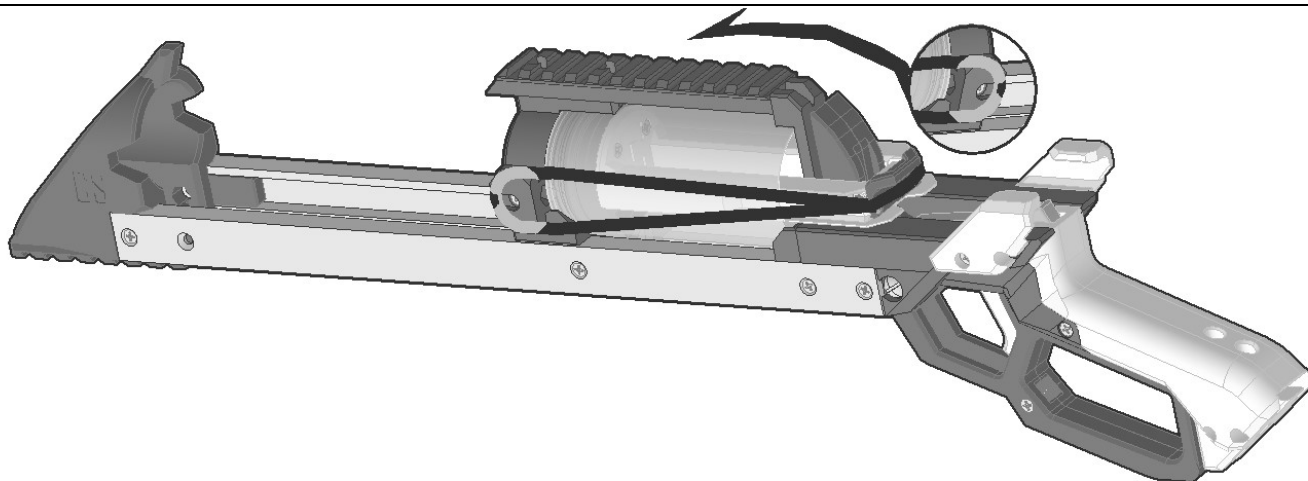
If you didn't print these parts, they were missing from the kit, or you're option to not use them, alternatively tie the free ends of the elastic cords together using a square knot. Clamp the loose ends and tie the knot as taught as possible.



Main elastic cord Installation



The 1/8" main elastic cord powers the plunger. Loop one end over the cleat on the side of the Cap print. Pull the opposite end of the loop towards the rear of the blaster, then twist it to cause it to develop a cross-over in the middle of the loop.



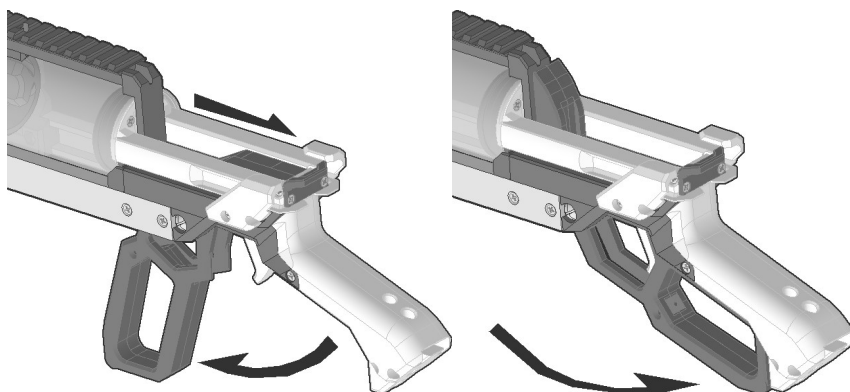
Wrap the cross-over around the back of the plunger and over to the other side of the blaster.

Secure the free end of the loop to the cleat on the other side of the Cap print.

Repeat this with a second, third, and if desired a fourth main elastic loop.

The 1/8" elastic is cut to 28 inches in length before being tied into a loop using a square knot. Thicker cords can be used, as can smaller sizes of latex surgical tubing and slingshot tubing. I would recommend the 3/8" size as a maximum.

You also have the option of increasing the load of the elastic loops by cutting them shorter than normal and retying them. I'm not yet sure what the minimum length possible is as that will require further testing.



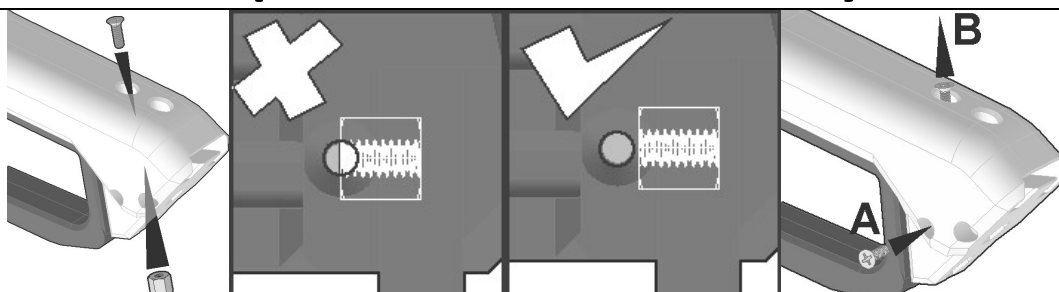
With the main elastic installed you prime the blaster by racking the Lever forward until the end of travel. The opposite end of the lever will act on the nylon standoff roller forcing the Plunger assembly back over the Sear and under the "Wings". For the shell ammo types this is when extraction and ejection occurs. And while the lever is forward the breech is open, so a full shell can be loaded into the Cart, or the magazine can be inserted or removed.

The breech is closed by racking the lever back into the grip. The trigger is ready to be fired.

To de-prime the blaster you can reach up over the back of the plunger and onto the nylon roller, then pull the trigger.

You can use your thumb to slowly move the plunger back toward the cam surface of the Lever assembly.

Optional Stock Assembly

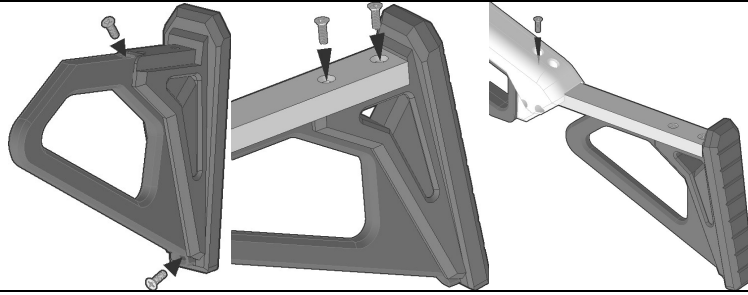


Force a Hex Standoff into one of the sockets in the Grip print. Drive a 4-40 screw into it from the hole in the opposite side.

Keep driving the 4-40 screw until the standoffs can no longer be seen through the perpendicular hole in the side of the print.

A. Once the perpendicular hole where shown is unobstructed by the hex standoff, drive a 4-40 screw into it the perpendicular hole. This screw will retain the standoff and prevent it from backing out of the socket.

B. Remove the 4-40 screw that was used to pull the standoff into the bottom of the socket.



Use two 4-40 screws to attach the optional StockDeco print to the front of the Stock print.

Use two 4-40 screws to attach the short 5.5" length of U-channel to the Stock print.

You may need to deburr the receptacle in the back of the Grip print in order for the U-channel to fit into it. Once cleared of drooping or curled strands of filament, insert the u-channel into the grip.

Drive a 4-40 screw in through the corresponding hole in the top of the grip, through the hole in the U-channel, and then into the standoff inside the grip until secure.