

# Build Instructions - README.txt

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#### Description
This a 3D Printable frame for:

Ruger SR9C, SR9CX, and SR9SC

The key to this project is the DIY-friendliness.

The system relies on a DIY metal rear rail which is added to a printed frame.
This results in longevity of use, reliability and safety, all while keeping the
costs and complexity to manufacture low.

Now, this write-up will be thorough so bear with us. This Readme is broken into
four sections:

1. Tools and Parts List
2. The Rails
3. The Frame
4. Assembly

The difficultly level of this build varies with the user. We are good with
tools and I'd say this build is not any harder than making an 80% lower for an
AR-15. As time goes on the gun community with gain a better understanding for
this design.

#### 1. Tools and Parts List
Below is a list of tools, parts and materials you should need to complete this
project.

##### Materials:
* eSun PLA+ or DuPont Zytel filament (or filament of your choice)
* Epoxy (if rail block is loose)
* Sandpaper
* .75"x1" Aluminum bar stock (for crafting rear rails)
* 1/8" Roll Pin

##### Tools:
* Dremel Tool (Dremel 3000 works well)
* Cutting wheels, sanding wheels, polishing wheel and compound
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- \* Metal files, including small diameter rat-tailed file
- \* Manual Mill, CNC Mill or X-Y Vise on a Drill Press (to mill the rails)
- \* M2.5 tap + 2.05mm drill bit
- \* Drill (battery, corded, or hand)
- \* Small and medium sized screwdriver
- \* Small punches

#### ##### Off the shelf parts:

- \* Complete SR9 upper (dressed or finished upper, barrel, recoil spring assembly) (from EveryGunPart, GunBroker, etc)
- \* Complete SR9 lower parts kit (from EveryGunPart, GunBroker, etc)

#### #### 2. The Rails

The specs for the rails are minimum dimensions; aim to overshoot them slightly if you are manually milling them. The dimensions given are for CNC or a milling setup. DO NOT UNDERSHOOT THE GIVEN DIMENSIONS. You can always remove more material if the slide does not fit, it is much harder to material after the fact.

#### ##### 2.1 Material

Aluminum or Mild Steel? I recommend aluminum just because it's easy to work with. The rails are long enough that the softness of the aluminum isn't an issue. The surface area lets them last a really long time. I have 700 shots on one rail block, 300 on another, and 900 shots on my rear rails; none have worn beyond a thousandth of an inch and that is such tight measurement that it could be blamed on caliper reading.

Something like a [3/4" X 1" ALUMINUM 6061 FLAT BAR 12" long .750 Solid Mill Stock] (<https://www.amazon.com/Pieces-ALUMINUM-6061-Solid-Stock/dp/B01F80WQ08>) from Amazon would work well. I have used cheap Chinese aluminum off of Amazon; 1x.75" bar stock is ideal and leaves a little material to be faced off. I will make a video explaining how to machine the rails at some point. The dimensions are included in the package for people who are knowledgeable, crafty and willing to give it a try.

The front rail can be secured by a cut down drill bit the same size as the pin hole in the block, or you can use a 3mm roll pin that is 28 mm. long. The rear rails work well with high quality M2.5x8mm screws with the ends of the screws ground down to leave them about 7.25 mm. long. The rear rails must be tapped for M2.5 threads of course, so the holes in them should be drilled with a 2.05 mm. drill bit. Kits are available on Amazon which offer a paired set of the M2.5 tap and 2.05 mm. drill bit.

#### ##### 2.2 Tooling/Sourcing

Ideally, you have or know someone with a mill, a x-y vise and a drill press, or a Ghost Gunner machine. Included with the files will be a printable jig for the Ghost Gunner created by Flood from FOSSCAD (he's the best!). Hopefully one of the more GG savvy folks can make a tutorial showing how to set that up on the GG and make it work.

I used a milling machine to make my first two blocks and have made a rough block from the end of a 12" bar stock to profile a rail using a Dremel tool and metal files and a hacksaw. We will include paper templates and a Dremel Jig soon that will aid in making the rails "the 3rd world way".

Knowing how to read a 2d drawing is very important when making the rails, as is owning and knowing how to use a set of calipers. I'll include quick 101s in my

tutorial on machining the rails.

SpookyRails may sell the rails.

To sum it up, the rails are the hardest part of the build but with the many ways to achieve this it should be possible for anyone who wants to make them.

### #### 3. The Frame

Screenshots of my slicer settings are included in the renders folder.

#### ##### 3.1 Print Settings

For a light duty/workable frames:

- \* Material: eSun PLA+
- \* Print Temp: 235 C
- \* Bed Temp: 60 C
- \* Bed Prep: Wipe clean, apply a thick layer of Elmer's glue stick. Kapton tape is recommended since this frame will really stick to the bed tight if you use the STL with the raft.
- \* Infill: 100%, Rectilinear Fill
- \* Enclosure: None
- \* Orientation: not super critical but using the STL with the raft will result in far less warp. Warp is the enemy of this project.
- \* Supports: full, hexagonal infill, sheathing on infill optional but recommended if your slicer supports it.

Remember that PLA will not stand up to hot environments. While the gun itself won't hold enough heat to hurt the frame (I dumped 50 rounds as quick as I could load them without issue), having this frame sit in a hot car would damage it.

For a heavy duty/durable frames:

- \* Material: Zytel or Glass filled Zytel
- \* Print Temp: 287 C
- \* Bed Temp: 100 C
- \* Bed Prep: Wipe clean, apply a thick layer of Elmer's glue stick. Kapton tape is recommended since this frame will really stick to the bed tight if you use the STL with the raft.
- \* Infill: 100%, Rectilinear Fill
- \* Enclosure: None needed, but it will not hurt if you use one.
- \* Orientation: not super critical but using the STL with the raft will result in far less warp. Warp is the enemy of this project.

If you use glass filled Zytel, you will need to coat the outside of the frame with fiberglass resin because the glass fill is very abrasive. Either Zytel frame will stand up to excessive amounts of abuse. Boiling the Zytel frame in water after printing will help layer adhesion without warping the part.

### #### 4. Assembly

Important items to note for assembly are noted in the instructional videos, but some are important enough to mentioned in this Readme as well:

- \* I advise NOT firing a completed gun at a public range due to the possibility of inadvertently making an unsafe gun. If you leave the rear rails sitting too high, the striker can slip and you will have double or triple wild-fires. Make sure the gun is in good working order by function testing thoroughly (rack the slide hard and ensure that the gun cocks and does not just let the striker fall). Bear in mind that you are making this at your own risk; if you follow

the instructions it should not double fire. If you do not follow directions, you might get yourself in trouble. Be safe out there.

\* Holes must be drilled to size. Don't try and hammer the pins in. They should go in easy.

\* If your front rail block is loose, consider just a little JB weld or epoxy on the sides/front to steady it. A loose front rail can cause issues.

\* If the locking block pin holes don't line up, don't try and force the pins through.

\* Yes, the rear rails are necessary. Do not fire the gun without them. See what is advised above; we are not guessing.