GALILEO R2

BUILD GUIDE

A PROJECT BY:
D3 FIREARMS, DURBANPOISONPEW, & UNSEENKILLER

AWCY?

PART 1: INTRODUCTION

Welcome to the Galileo R2 Build Guide. This project represents over 1 year of testing and tweaking and we are very proud to share this design.

This is **YOUR ADVENTURE** and we encourage you to make this design your own. Work with the included .step files to make your own handguard or accessory. Share what you create with the community. Enjoy your build with others. Create an adventure for yourself. These files are provided as a baseline design to be further tweaked.

What is the Galileo R2? It's a platform based on the Ruger 10/22 utilizing several key firearm parts and a little bit of hardware. The exciting part is actually how it's assembled. This design has taken a step away from the traditional design and is intended to be built in just 10 minutes . Our goal is to help you build and assemble a reliable plinker. This is a ground-up redesign. The R2 parts are NOT compatible with the original Galileo.

Special thanks go out to the excellent beta testers at Are We Cool Yet? and those that joined from the greater public. Your contribution made this possible.

This is a collaboration with DB Firearms, Durbanpoisonpew, and unseenkiller.

PART 2: REQUIRED PARTS

REQUIRED OEM/Aftermarket 10/22 Components:
(1) 10/22 Bolt and Charging Handle Assembly*
(1) 10/22 Trigger Pack
(1) 10/22 Barrel of any kind, or DIY Barrel with liner/Proto Barrel

Optional Components:
(1) AR-15 Free Float handguard + Barrel Nut**
(1) AR-15 Patterned Grip either commercially available or 3d printed***

REQUIRED PRINTING: Receiver Hardware
Hardware kits are available at dbdesignworks.com which directly supports developer

(1) M3x10mm Steel Dowel Pin (Handguard Alignment Pin)
(8) M4 Hex Nuts
(1) M4x22mm Button Head Screw (Takedown Screw)
(2) 3/16" x 1.25" Dowel Pins OR (2) OEM 10/22 Trigger Pack Pins (Trigger Pack Retaining Pins)
(3) M4x18mm Flat Head Screws (Receiver Top Rail Screws)
(2) M4x30mm Socket Head Screws (Handguard Retainer Screws)
(1) M5 Square Nut (Grip Attachment Nut)
(1) M5x25mm Socket Head Screw (Grip Attachment Screw)
(2) M4x25mm Flat Head Screws (Rear Rail Screw)

OPTIONAL PRINTING: Brace or Stock Required Hardware
---For any of the DURBAN STOCKS AND BRACES---
(2) M4x35mm Socket Head Screws (Brace Attachment Screws)
(4) M4 Hex Nuts
(2) M4x16mm Socket Head Screws (buttpad or brace rear attachment)
---for the 553 Stock, you'll need these for the buttpad---
(2) M3x12mm Socket Head Screws
(2) M3 Nuts
---for the folding mechanism you'll need these---
(1) M5x30mm Socket Head Screw (Hinge Screw)
(1) M5 Hex Nut (Hinge Nut)
(1) M2x10mm Socket Head Screw (Button Retainer Screw)
(1) .75" Compression Spring (Button Spring) McMaster 9657K287

---For the UNSEENKILLER ALLTHREAD STOCK + RAIL ACCESSORIES---
(2) 1/4" 20TPI All Thread 225mm
(4) 1/4" 20TPI Nuts
(1) M3 Nut (Buttpad Nut)
(1) M3x35mm Socket Head Screw (Buttpad Screw)
(2) M5x30mm Socket Head Screws (Pic Rail Attachment)
(2) M5 Nuts (Pic Rail Nuts)
(2) M5x25mm Socket Head Screws
(2) M5 Nuts

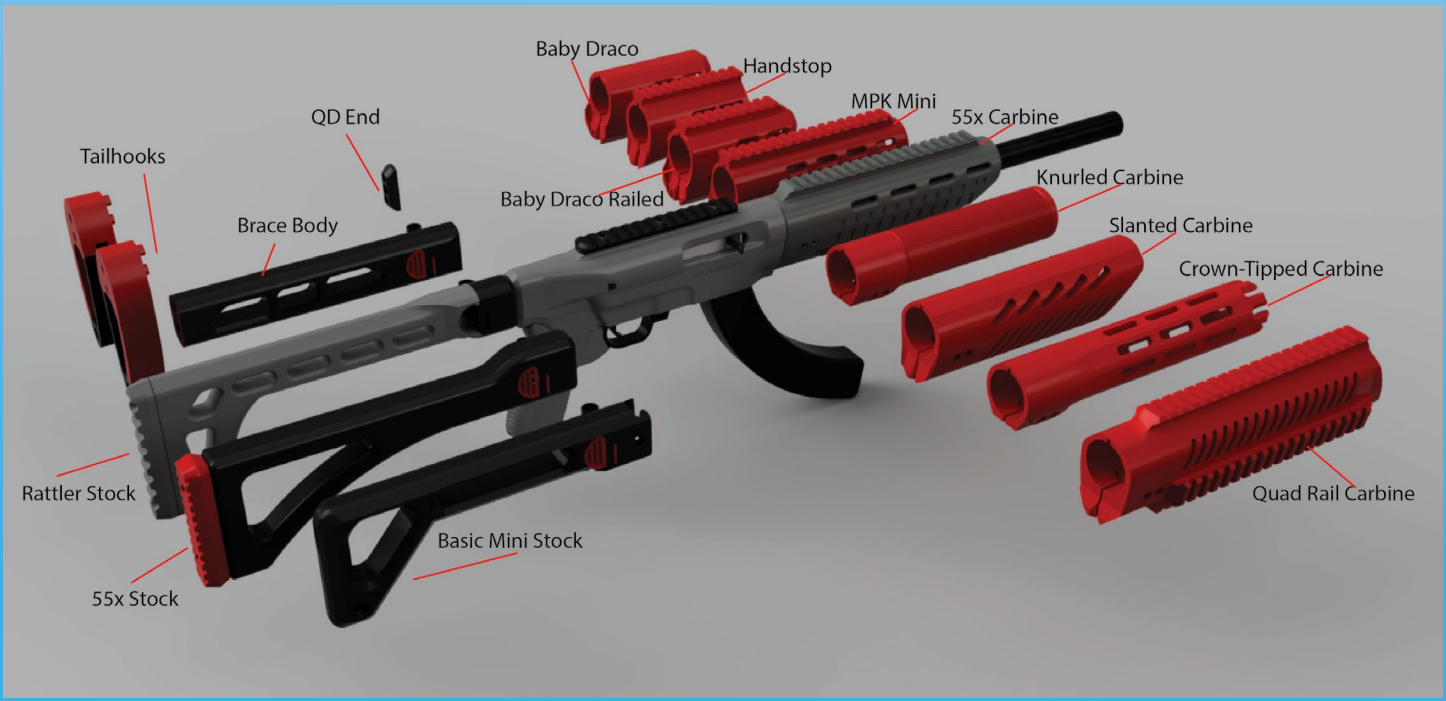
* Aftermarket charging handles like the ones available on ebay are often shorter than OEM and may cause you problems, specifically causing the bolt to not fully return to battery.
**This platform is compatible with AR-15 free float handguards and barrel nuts. If you want to use any of the 3d printed handguards, you will need to print the barrel nut included in the files.
***There is no specific grip included in these files, however, a good option is the ridgeback grip found here: Ridgeback Grip

PART 3: PRINTING INSTRUCTIONS

There are a multitude of different combinations you can build. Your barrel length will likely determine the route you're going to take. A 16" barrel or longer will mean you're building a rifle, so you can print pretty much any of the handguards and stocks. If you choose a shorter barrel, you will want to correspond the handguard length with the length of your barrel. You will also not want to put a stock on a build with a short barrel unless you are interested in either creating a SBR, or a NFA violation. At the end of the day this is YOUR responsibility to understand.

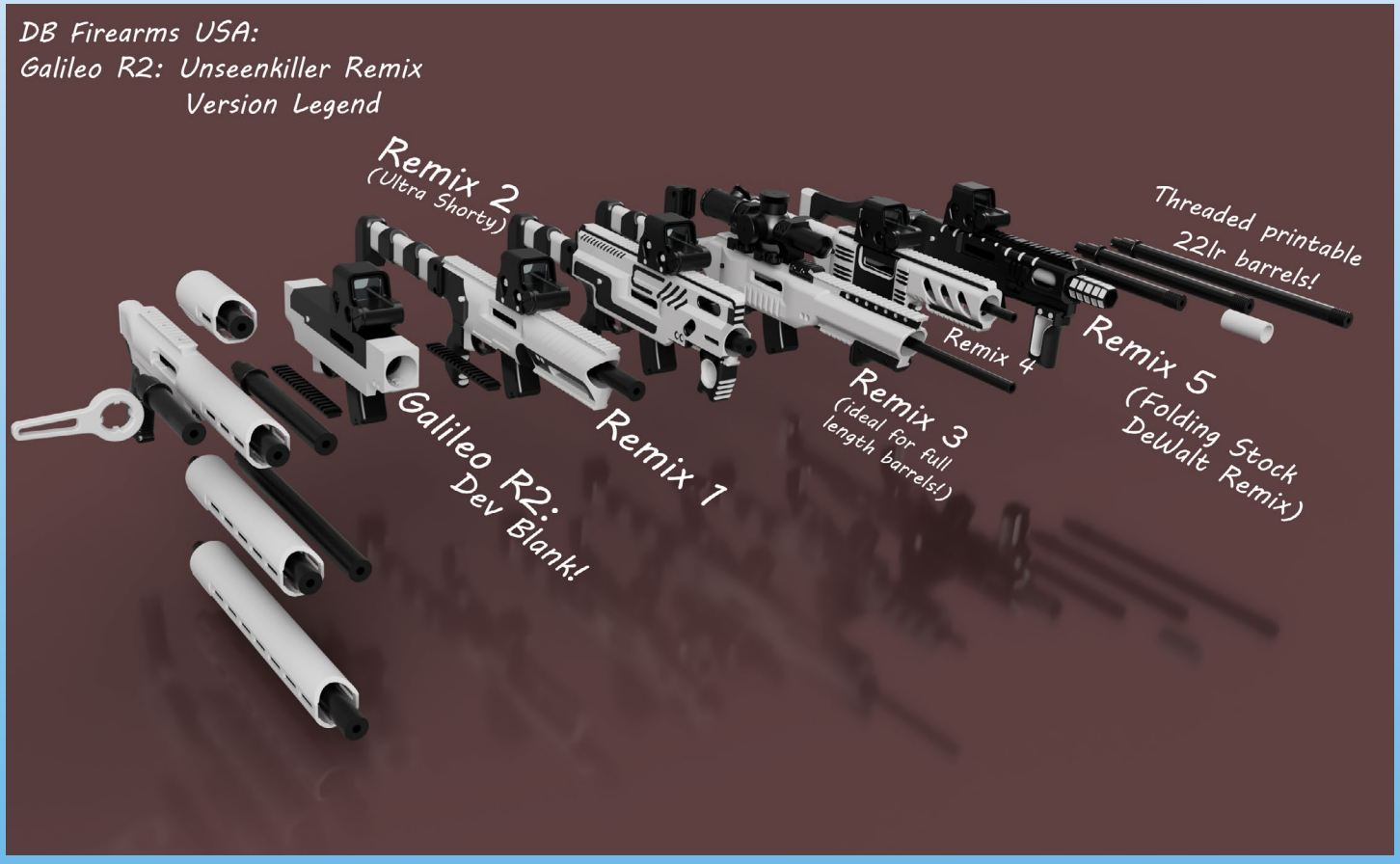
Handguard length as measured from the front of the receiver:

10 inch Aesthetic Mlok: 10"
13 Inch Aesthetic Mlok: 13"
4 Inch Aesthetic Mlok: 4"
55x Carbine: 8.8"
7 Inch Aesthetic Mlok: 7"
Baby Draco: 4.75"
Baby Draco Railed: 4.75"
Crown-Tipped Carbine: 9.2"
Handstop: 4.4"
Knurled Carbine: 7.94"
MPK Mini: 7.3"
Mini Knurled Windowed: 4.56"
Mini Knurled: 4.56"
Quad Rail Carbine:10.16"
Slanted Carbine: 8.2"



PART 3: PRINTING INSTRUCTIONS

Another excellent option to proceed with your build is to choose one of the several unseenkiller remixes available. These builds have specially remixed receiver and handguard combinations that mesh well together. There are several handguard lengths. The pistol length handguards will support up to a 6” barrel.



You will also find blank or template versions of the receivers and handguards in the .step files. These are available to help you design your own receiver or handguard and retaining the geometry of the important components.

PRINTING INSTRUCTIONS

Once you have selected the handguard you'd like to use, you'll also want to decide if you're printing a stock or brace to go along with your build. Many of the stocks/braces and handguards were lovingly designed by durbanpoisonpew.

The unseenkiller brace/stock options pair very well with his receiver and handguard combo. However, his receiver comes railed in the back and should work with any of the rail compatible stocks or braces.

The receiver, both lower and upper, are the same regardless of build for the core design. For the unseenkiller builds, the receivers have different styles depending on the version you select. It is suggested you select the corresponding parts for the unseenkiller remixes. The barrel nut will differ only slightly between builds. Print the standard barrel nut for all OEM, DIY(3d printed), and aftermarket barrels. If you've made a proto barrel, print the barrel nut designed for the proto barrel, which has more clearance for the body of the barrel.

PRINT SETTINGS:
All of the parts have been tested in a high quality PLA+ filament and are shown to withstand the abuses of 22LR well. However, the barrel nut specifically should be printed out of your best filament to avoid issues.

Print all files in the orientation they're loaded into the slicer as-is. This is crucial to strength of the part. Pay special attention to the buffer pin. This should NOT be printed vertically.

Print with solid infill for all parts and as hot as you can manage without poor print quality.

NOTE: This guide is not meant to help you perfect your print settings. If you get poor print quality you will have a poor quality build. Perfect your settings and then come back to make a Galileo. Tolerances are set to .2mm of clearance between most parts. if your printer deviates from that, you will have issues with this build.

3D PRINTED BARRELS:
This build supports the proto barrels which can be found here: PROTO BARRELS

There are also DIY barrels included in the files in various lengths. A detailed explanation will not be provided in this readme. However, instructions on building these can be found in the files. A general understanding of chamber reaming is required. You will also need to use liner from Redmans, most commonly available at Brownells. It has an OD of 7.9mm or 5/16".

redmans liner here: 22LR liner 25" long

ASSEMBLY PROCEDURE

It is strongly advised that you watch the assembly procedure in the assembly video here:
GUTTERCHEESE ASSEMBLY VIDEO

Step 1: Upper Receiver Assembly

Start by installing your 1913 printed rail on the top of your upper receiver(this step is skipped if using unseenkiller remixes). Use the 3 corresponding M4x18mm flat head screws and 3 M4 nuts to secure it. If you're worried about these coming loose, you can use a small dab of Loctite 242 (Blue) on each screw. Ensure that the screws do not protrude into the inside of the receiver.

Next, install the charging handle through the ejection port with the long end of the charging handle nesting into its corresponding divot. Pull the charging handle backwards and drop your bolt into place, with the charging handle latching into the bolt. Allow the bolt to move forward into position.

Install your printed buffer pin into your receiver. This should be a press fit. Gently tap into place with something soft, like the plastic handle of a screwdriver. With the receiver upside-down, you can gently pull the charging handle back to make sure your bolt moves freely - it should. If not, check to see where it is rubbing and remove material from the receiver until it moves freely.

Step 2: Barrel Installation

The barrel will be the tightest fit on this build. The tight fit is intentional. It prevents the barrel from drooping and impacting accuracy. Depending on your barrel manufacturer, you may have an overly-tight barrel. In fact, many aftermarket companies intentionally oversize the barrel shank with the intention of having it sanded down to perfectly fit your receiver. In our case, it's better to modify the receiver and leave the barrel shank diameter alone. If it doesn't fit, you can gently spin it and allow the extractor groove to shave material away from the receiver. Do not tap your barrel into the receiver as this can cause the receiver to crack. The breech end of the barrel will slightly prodrude past the inside face of the receiver by about 1-2mm. This is intentional. Once you're sure it fits well in the receiver, remove it. If you are using an OEM tapered barrel, you'll want to remove the front and back sights from the dovetails. This will allow the barrel nut to be installed over the barrel.

Before moving on, install the M4 nut in the corresponding pocket inside the barrel hole of the upper receiver. once the barrel is installed, this area will be inaccessible, so don't forget it!

Install the printed collar around your barrel and re-install the barrel in your receiver. Once the barrel is fully seated in the receiver, the collar should be flush with the printed threads at the front of the receiver and the locating notch should match up as well. If the collar is unreasonably tight, you may need to sand down the inside of the collar slightly to ensure it's making good contact with the barrel.

You can now install the barrel nut. If it's too tight, it's a sign that something is not right with your print settings. You can use the printable barrel nut wrench to get a good grip on the nut and install until it bottoms out. Dont over-tighten or the nut will likely split/crack, or the receiver will. Either way it's a bad time!

ASSEMBLY PROCEDURE

Step 3: Handguard Installation

Once your barrel nut is tight, we can move on to installing your handguard. Tap in the M3x10mm dowel pin into the corresponding hole at the front of your receiver. Then, slide your handguard over the barrel and line it up with the pin. Press it down until the handguard meets the front of the receiver. use the M4x30mm socket head screws and M4 nuts to tighten the handguard in place. This will clamp the handguard to the barrel nut.
If you chose to use an AR free float handguard, you should also use the AR's barrel nut in place of a printed one.

Step 4: Lower Receiver Assembly

Install your 3/16" trigger pack pins into the trigger pack and lower it into the top of the lower receiver. The pins should line up with their corresponding notches. Using light pressure, click the trigger pack into place. This is a press fit, but you should feel the pins click in and know when to stop pushing.

After the trigger pack is secured, install the M5 square nut in the grip screw area and instal your grip with a corresponding M5 screw. DO NOT OVER-TIGHTEN.

Lastly, you can install your brace or stock to the back of the lower receiver using the corresponding M4 bolts and nuts. Or, alternatively, you can install the rail on the back for your own stock or brace that uses 1913 Picatinny Rail. The unseenkiller remix does not require this step as it has a built in rail as part of the print.

If you choose to install the rail, you'll use the M4x15 flat head screws and the corresponding M4 nuts on the back/inside of the lower receiver.

Step 5: Mating the Upper and Lower

The upper is designed to nest into the lower at an angle, it should slide right into place. Your final step is to install the M4x22 button head screw in the bottom of the lower receiver to connect the upper and lower. Once again check bolt function. At this stage, you can add your favorite dry lube and head to the range to test function.

DISCLAIMER: Do not function test with live ammunition unless you are at a safe shooting spot. In your home, test with snap caps if you prefer to make sure feeding is correct before going to the range. Don't shoot yourself!

Troubleshooting: Like any 10/22, this is bound to malfunction at some point. So, you can follow any advice that a normal 10/22 would follow to get things working right. This advice almost always comes down to the magazine. Use OEM mags when possible. Make sure they're clean. If you still run into issues, you can reach out to DB on twitter for help, or join the AWCY channel to discuss this design with beta testers and other experts.

CREDITS

Special Thanks to durbanpoisonpew and unseenkiller on providing so many customization options for the R2. They went wild and came up with some fantastic options for the project.

Thanks to Guttercheese for the impeccable assembly video and the thorough testing

Thanks to LackLuster for providing the amazing launch trailer

The following beta testers provided great feedback and made this build possible:

40ozOE
CHAOS TWIN 1: festiva3d
Chaos Twin 2: thekid
HardlyLethal
Kimera
Nester
OA
OrionDefenseGRp
Pewdini
R B
bakasama113
cptpackrat45
csprouts
eadams2010
gCode
jdm
jeffvader
liluzikit
lukewarmdesigns
moj3b
nerfherder
okijohnr
petruccis_beard
pla_ak_ak_ak
printing_is_rad
rad8tion
ruger1022
saaxom
scnettek
wngpwnp4sr
youngyc
zanzybar