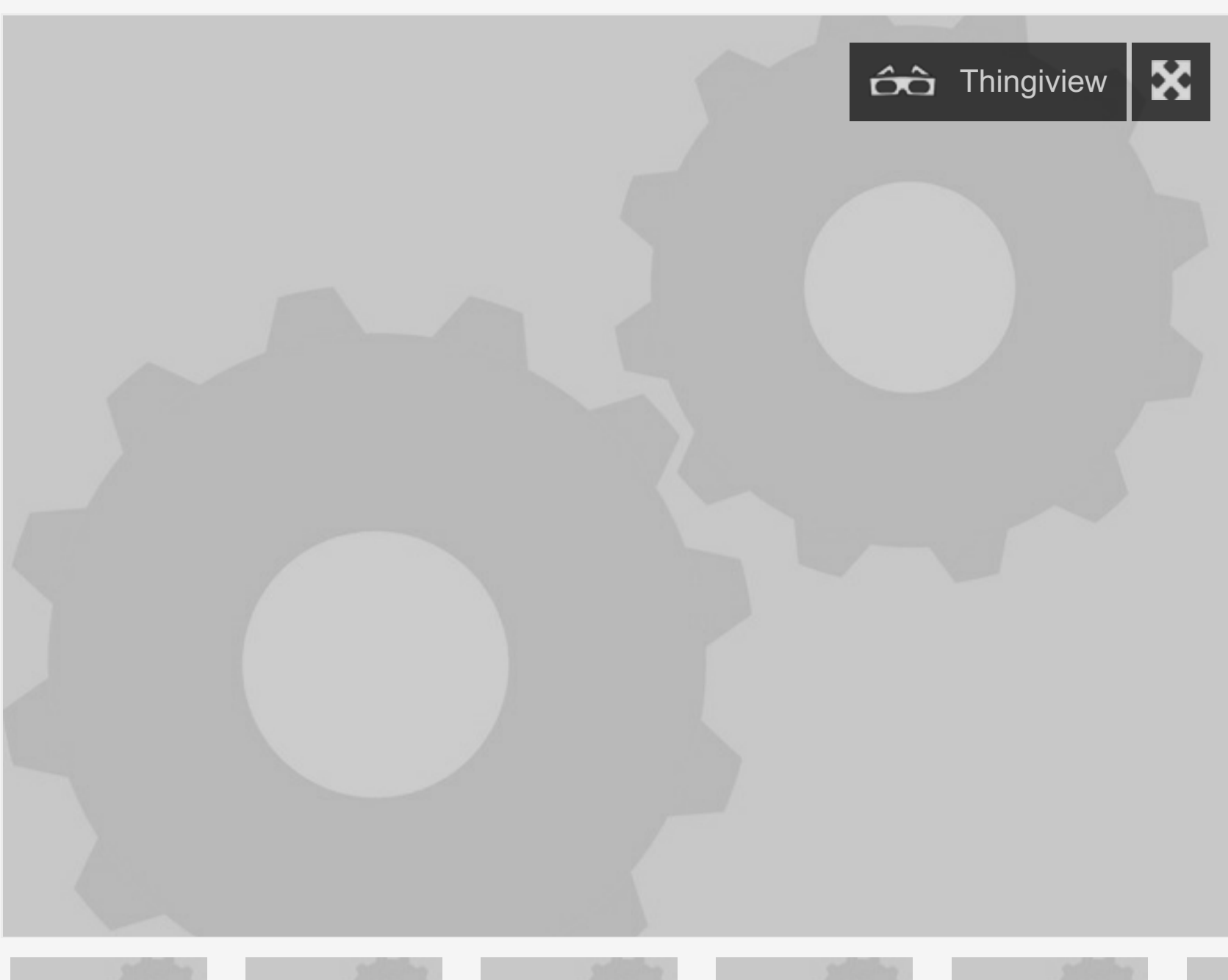


# Root 3 CNC multitool router 3D printed parts

by [sailorpete](#) Nov 1, 2016



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## Contents

Summary  
Print Settings  
R3

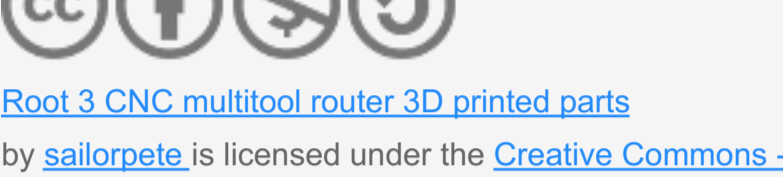
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## Summary

### R3! Official Website!

Join our forum and ask questions with our community. <https://www.rootcnc.com>

### Info

Current Version = R3

The Updated version of Root2 CNC is here! I have been completely blown away with the community which has been created by this project and listening to all the comments and suggestions made - R3 was created. R3 is keeping to the same design goals as before, but since then a lot has been learnt and areas for improvements been highlighted. There have been many changes implemented on this revision, some radical and some minor though all the changes have been implemented to increase configurability, rigidity, flexibility, accuracy and also reduce the amount of different parts required.

R3 supports the use of the largest of NEMA23 motors and also the NEMA17s motors depending on the user's configuration. Its accuracy has also been increased by the removal of the second loop of belt on the Y-Axis whilst still keeping the two side of the gantry still connected together. The second loop of belt introduced a position error when a load was applied to the gantry, now there is only single belt length to increase its positional accuracy. By doing this made it difficult to keep the two sides of the gantry relatives to one another (something another 3D printed CNCs suffer with). Though R3 gantry sides are connected together, so no matter if the machine losses power or is disconnect the machine still stays relevant to one another to keep its running true and square.

Belt or Lead screw? This has been an interesting topic but no matter what your preference is, R3 has provisions for a Lead screws as drive mechanism for both the X and Y Axis. This does require some of your own design work to fit the type of Lead screw the individual is running though the core R3 shouldn't need any modification and will work with Belt of Lead screws.

Linear Guilds for the Z axis?! I know theses aren't considered cheap. But once all the variables and benefits have been factored in, they become a compelling option to use. especially for the short lengths the Z axis requires. With the original design there was sufficient play in the carriage, due to its minimalist design. Though R3 has attempted to removed or possibility of play with the wood panel and the use of Linear Guilds. But don't think this is the only limited to linear guilds, R3 keeps legacy support implementing the same linear bearing style design and also legacy Z carriages.

### Build one

Please if you build one, post some photos! I would love to see them!

### Shop

If you need parts for your CNC Machine then visit the Root CNC shop <https://rootcnc.com/shop/>

### Facebook

Consider joining us on our Facebook group to share and ask questions. <https://www.facebook.com/groups/1023078667749894/>

### Forum

<https://rootcnc.com/forums/>

### YouTube

Check out my YouTube Chanel <https://www.youtube.com/user/sailorpete12>

If you like the work I have been doing and fancy supporting me, please feel free to hit the "Tip Designer" button up top. It's much appreciated

### Print Settings

**Printer:**  
Own Design Printer

**Rafts:**  
Doesn't Matter

**Supports:**  
Yes

**Resolution:**  
0.25-0.35

**Infill:**  
50%

**Notes:**

- Strength is key! use the hardest settings possible
- Print with 3-4 perimeters
- Print with ABS but PLA will be fine though your mileage may vary

### R3

#### Goals

- Create an expandable CNC machine capable to machine aluminium
- Use minimal different 3D printed parts
- Customization (Make it Bigger, Use different motor and drive methods\_
- Cheap
- Simple
- Use parts commonly used in DIY 3D printer
- Easily sourced parts

#### BOM

See R3.zip for the BOM

BOM in embedded in the .Zip File

#### CAM Software

- Generate the Gcode  
I use PathCam, free open source software with minimal settings to enter to get up and running. Its not perfect but still does a great job! see link for more information.

<https://github.com/xenovacivus/PathCAM>

#### Revision History

R2.1.1:  
-Base

R2.1.2:  
-Added Z-Axis Linear Guild Wooden Front & Back Single Compatible Part (.STL)  
-Nema23 50mm Spacer (Missing from Original)  
-Nema17 50mm Spacer (Missing from Original)

R2.1.3:  
-Amended Y Gantry side panel holes to the correct dimensions

R2.1.4:  
-Added Mirrored version of the Y axis box mounts  
-Added a universal front and rear X carriage Z plate

R2.1.5:  
-Added a first rev of the BOM!! (about time hay :) ). use the filter tab to help configure your setup (requires MS office)  
-Added a Connector Panel for G16-4 connectors  
-Revised the X axis belt clamps  
-Added the missing drag chain mount.  
-Added the optional Y gantry bearing cap with added cable management tab.

#### R3 Working Release

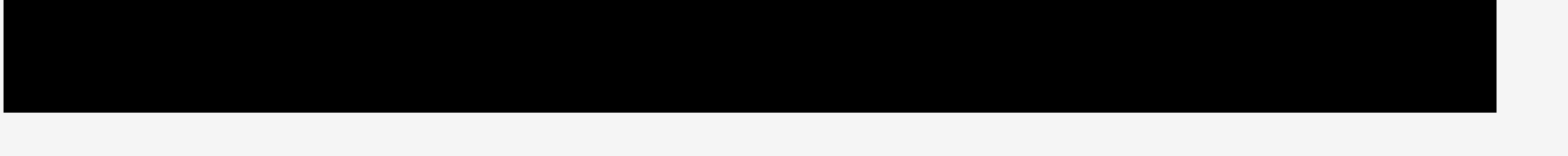
-Tweaked the Z carriages with the new test and also increased the clearance for the Z endstop switches  
-Added the Z Probe connector for 4mm bannana plugs  
-Tweaked the BOM slightly

#### Wishlist

-Lead screw mounting for X and Y axis!

#### Assembly Guild

Animated Assembly guild:  
<https://www.youtube.com/playlist?list=PL5ghy18PulWahNTYJ5U9uzd7b4gYzUDA>



#### Facebook Group

Join our Facebook group for discussions about the machines!  
<https://www.facebook.com/groups/1023078667749894/>

