V1 ENGINEERING

# Bill Of Materials

## Printed Parts

There are 3 different sets of printed parts **C-**23.5mm, **F-**25mm, or **J-**25.4mm (1in). The measurement is for the Outside Diameter of the conduit/rails/tubing. **Please measure your rails before printing. 23.5mm fits 3/4″ EMT conduit in the US. Anywhere else you must physically measure first, some things are sold as Inside Dimension (ID) (conduit), or Outside Dimension (OD) (Tubing).** Bummer

Steel hardware store EMT conduit works well and is inexpensive, an upgrade would be .049″ wall thickness stainless steel tubing (or thicker is fine as well). Stainless Steel tubing is more rigid and smooth, but also much more expensive.

Recommended Print Settings; PLA for dimension accuracy (PETG is also good, if your dimensions are verified good), 2 or more perimeters for through hole strength. There are some steep walls so no more than 75% layer height to nozzle diameter, **no support** should be needed for any part I have designed.

| QTY | Name | Infill | 23.5 Link | 25mm Link | 25.4mm Link | Time/part | Total time | Grams Per Part | Total grams |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Bottom_Corner* | 55% | Link | Link | Link | 2:35 | 5:10 | 34.7 | 69.4 |
| 2 | BottomM_Corner* | 55% | Link | Link | Link | 2:35 | 5:10 | 34.7 | 69.4 |
| 2 | Lock-Corner* | 55% | Link | Link | Link | 1:28 | 2:56 | 20.8 | 41.7 |
| 2 | LockM_Corner* | 55% | Link | Link | Link | 1:28 | 2:56 | 20.8 | 41.7 |
| 2 | Top_Corner* | 55% | Link | Link | Link | 2:06 | 4:12 | 32.9 | 66.1 |
| 2 | TopM_Corner* | 55% | Link | Link | Link | 2:06 | 4:12 | 32.9 | 66.1 |
| 4 | Spacer_Corner_*_Burly | 65% | Link | Link | Link | :15 | 1:05 | 4.17 | 16.6 |
| 4 | *-Foot_2018 | 35% | Link | Link | Link | 2:20 | 9:20 | 31.8 | 127.1 |
| 2 | *-Roller | 55% | Link | Link | Link | 5:35 | 11:10 | 90 | 180 |
| 2 | *-Roller M | 55% | Link | Link | Link | 5:35 | 11:10 | 90 | 180 |
| 4 | RollerMount | 55% | Link | Link | Link | 3:30 | 14 | 50 | 200 |
| 4 | RollerPlate (optional Dual) | 55% | Link | Link | Link | :10 | :40 | 2 | 8 |
| 2 | XY_*_Burly | 55% | Link | Link | Link | 11 | 22 | 201 | 402 |
| 2 | XYZ_*_Burly | 65% | Link | Link | Link | 5 | 10 | 71.5 | 143 |
| 2 | Gantry_Spacer_* | 55% | Link | Link | Link | :22 | :45 | 10.3 | 10.3 |
| 2 | Nut_Trap_Burly | 55% | Link | Link | Link | :27 | :55 | 16 | 32 |
| 1 | Tool_Mount_*_4mm/6-32 | 35% | Link | Link | Link | 4:45 | 4:45 | 63.4 | 63.4 |
| 1 | Z_Lower_*_Burly | 55% | Link | Link | Link | 2:15 | 2:15 | 35 | 35 |
| 1 | Z_Motor_*_Burly | 55% | Link | Link | Link | 2:15 | 2:15 | 31 | 31 |
| | | | | | | | **Total** | | **Total** |
| | | | | | | | ≈115hrs | | 1.8kg |

My current full set prints in 91 Hrs.

* =the asterisk stand for part letter (C, J, F) and anything after that is the current revision (Burly, v1, v2)

M = Mirrored parts, either see the build instructions of FAQ's if you are worried.

Printed Parts Changelog

10/15/18 – Burly Center & Z

4/1/18 – Optional dual plate.

3/19/18 – New foot.

5/9/17 – lead screw compatible XYZ

7/13/16 – New Rollers

5/25/16 – New middle and Z-Axis assemblies

4/24/16 – New corner assembly

## Electronics/Motion Parts

Recommended electronics, you have a lot of options. I chose these specific parts for price vs. performance.

Some of these are affiliate links, you can buy from these links or just use them for information. In case you didn't know amazon prime is free for students, and here is free 30 day trial for non students.

| Qty | Part | Link |
|---|---|---|
| 1 | Mini-RAMBo (or RAMBo) | Amazon Or Shop |
| 1 | 12v ≥5A power supply | Amazon Or Shop |
| 1 | GT2 belt (4M = 24″x24″) Do not get the steel re-enforced ones. | Amazon Or Shop |
| 4 | GT2 16T Pulley | Amazon Or Shop |
| 53 | 608 2-RS Bearings | Amazon Or Shop |
| ≅18ft | Rails (Conduit or Stainless Steel) | info, info – Cut Calculators |
| 5 | Nema 17 Steppers | Amazon Or Shop |
| 1 | Wiring harness (Or extended your stepper plugs with Stranded Wire) | wiring kit, Stranded Wire |
| ≥20 | Zip Ties | Amazon Or Shop |
| | | |
| **Spindle Options** | | |
| | **Best option** | |
| 1 | Dewalt 660 (600W) 120V | Amazon |
| | **Second Choice** | |
| | Spindle 300W-800W | Amazon |

Blank tool mount for any other tools you might want to use.

## Hardware

Hardware needed.

| Qty | Imperial | Metric | Link |
|---|---|---|---|
| 1 | T8 Leadscrew and nut | T8 | Amazon or Shop |
| 1 | Lube for the T8 | | Shop |
| 1 | 5mm-8mm coupler | | Shop |
| 1 | 5/16-18 X 5 | M8 X 130 | Amazon |
| 12 | 5/16-18 X 2.5 | M8 X 65 | Amazon |
| 2 | 5/16-18 X 1.5 | M8 X 40 | Amazon |
| 28 | 5/16-18 X 1.25 | M8 X 30 | Amazon |
| 43 | 5/16-18 Nylock Nuts | M8 | Amazon |
| 19 | M3 X 10 | M3 X 10 | Amazon |
| 57 | #6-32 X.75 | ***M4 X 20 | Amazon |
| 57 | #6-32 Nylock nuts | ***M4 | Amazon |

*** The difference in the size of nuts requires some creative tightening if you don't use #6's on a few parts. A small flat head screw driver can usually be wedged in to stop the nuts from rotating if you have an issue.

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