

LULZBOT MINI DEVELOPER'S GUIDE



LulzBot Mini Developer's Guide
by Aleph Objects, Inc.
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Introduction

Welcome Aboard

Audience

This is a developer's guide to hacking on the LulzBot Mini 3D Printer. It is meant for developers, not users, of the printer.

Open Source Hardware, Free Software

Aleph Objects, Inc. is a Loveland, Colorado, USA company that manufactures Open Source Hardware using Free Software.

For more info, visit <http://www.alephobjects.com>.

LulzBot Mini Developer Overview

1.1 LulzBot Mini

The LulzBot Mini is a 3D Printer currently under development. The abbreviated name is mini-dev.

The source files are available here:

<http://devel.lulzbot.com/mini/>

1.2 Versions

Each new version of the mini-dev has a new name, with the next letter in the alphabet.

- Azalea - First Prototype
- Begonia - Second Prototype, being built now
- Camellia - Third Prototype
- Daffodil - First Production batch

1.3 Begonia Photos

Figure 1.1: Begonia Front Photo

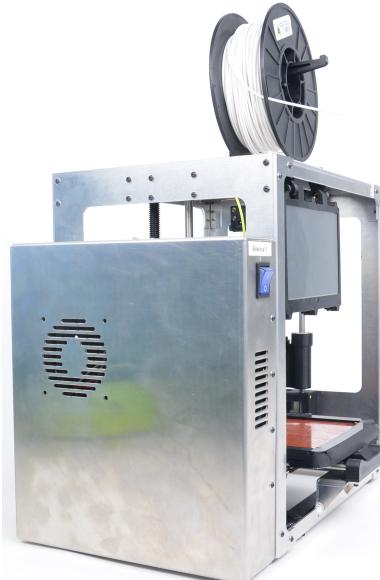


Figure 1.2: Begonia Left Photo

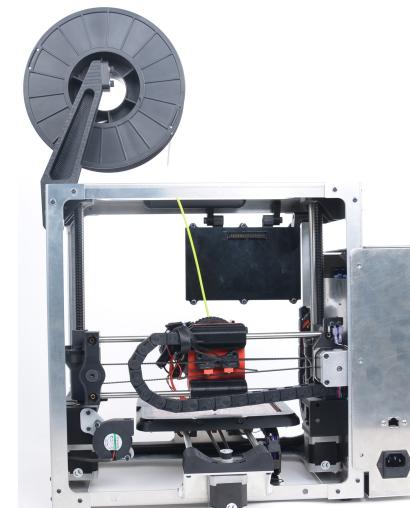


Figure 1.3: Begonia Back Photo



Figure 1.4: Begonia Right Photo

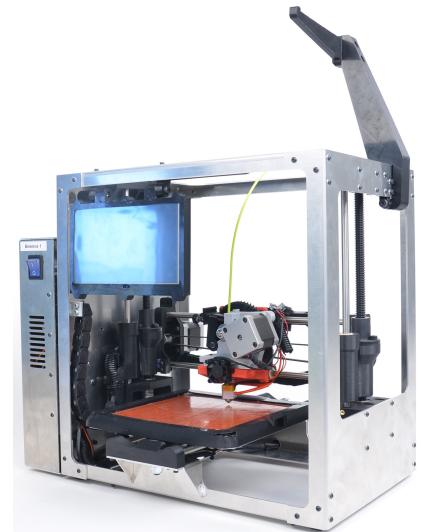


Figure 1.5: Begonia Spool Arm Up Photo



Figure 1.6: Begonia Spool Arm Down Photo



Figure 1.7: Begonia Green Color Scheme Photo



Figure 1.8: Begonia Black Green Color Scheme Photo

Mechanical

Cartesian Bot in X, Y, Z

2.1 Intro

Mechanical hardware specs and parts are in these subdirectories:
<http://devel.lulzbot.com/minibot>

2.2 Daffodil Bill of Materials

Daffodil is the first production run of units for retail.

Case Number	Case Name	Case Type	Case Status	Criminal ID		Officer	Date	Time	Unit	Location	Description
				ID	Number						
2023-00001	John Doe	Murder	Open	1234567890	1234567890	Officer A	2023-01-01	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00002	Jane Doe	Murder	Open	1234567890	1234567890	Officer B	2023-01-02	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00003	Bob Smith	Murder	Open	1234567890	1234567890	Officer C	2023-01-03	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00004	Susan Johnson	Murder	Open	1234567890	1234567890	Officer D	2023-01-04	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00005	David Wilson	Murder	Open	1234567890	1234567890	Officer E	2023-01-05	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00006	Emily Davis	Murder	Open	1234567890	1234567890	Officer F	2023-01-06	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00007	Michael Green	Murder	Open	1234567890	1234567890	Officer G	2023-01-07	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00008	Sarah Brown	Murder	Open	1234567890	1234567890	Officer H	2023-01-08	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00009	Robert Miller	Murder	Open	1234567890	1234567890	Officer I	2023-01-09	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00010	Elizabeth White	Murder	Open	1234567890	1234567890	Officer J	2023-01-10	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00011	James Black	Murder	Open	1234567890	1234567890	Officer K	2023-01-11	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00012	Anna Green	Murder	Open	1234567890	1234567890	Officer L	2023-01-12	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00013	Christopher Blue	Murder	Open	1234567890	1234567890	Officer M	2023-01-13	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00014	Frances White	Murder	Open	1234567890	1234567890	Officer N	2023-01-14	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00015	George Black	Murder	Open	1234567890	1234567890	Officer O	2023-01-15	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00016	Hannah Green	Murder	Open	1234567890	1234567890	Officer P	2023-01-16	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00017	Isabella Blue	Murder	Open	1234567890	1234567890	Officer Q	2023-01-17	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00018	James Miller	Murder	Open	1234567890	1234567890	Officer R	2023-01-18	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00019	Karen Black	Murder	Open	1234567890	1234567890	Officer S	2023-01-19	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00020	Laura Green	Murder	Open	1234567890	1234567890	Officer T	2023-01-20	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00021	Mark Blue	Murder	Open	1234567890	1234567890	Officer U	2023-01-21	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00022	Natalie White	Murder	Open	1234567890	1234567890	Officer V	2023-01-22	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00023	Oliver Black	Murder	Open	1234567890	1234567890	Officer W	2023-01-23	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00024	Peter Green	Murder	Open	1234567890	1234567890	Officer X	2023-01-24	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00025	Quinn Blue	Murder	Open	1234567890	1234567890	Officer Y	2023-01-25	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00026	Rachel White	Murder	Open	1234567890	1234567890	Officer Z	2023-01-26	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00027	Samuel Black	Murder	Open	1234567890	1234567890	Officer AA	2023-01-27	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00028	Victoria Green	Murder	Open	1234567890	1234567890	Officer BB	2023-01-28	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00029	Walter Blue	Murder	Open	1234567890	1234567890	Officer CC	2023-01-29	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00030	Xavier White	Murder	Open	1234567890	1234567890	Officer DD	2023-01-30	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00031	Yvonne Black	Murder	Open	1234567890	1234567890	Officer EE	2023-01-31	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00032	Zachary Green	Murder	Open	1234567890	1234567890	Officer FF	2023-02-01	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00033	Alice Blue	Murder	Open	1234567890	1234567890	Officer GG	2023-02-02	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00034	Bethany White	Murder	Open	1234567890	1234567890	Officer HH	2023-02-03	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00035	Craig Blue	Murder	Open	1234567890	1234567890	Officer II	2023-02-04	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00036	Dawn White	Murder	Open	1234567890	1234567890	Officer JJ	2023-02-05	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00037	Elijah Blue	Murder	Open	1234567890	1234567890	Officer KK	2023-02-06	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00038	Fiona White	Murder	Open	1234567890	1234567890	Officer LL	2023-02-07	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00039	Gavin Blue	Murder	Open	1234567890	1234567890	Officer MM	2023-02-08	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00040	Hannah Blue	Murder	Open	1234567890	1234567890	Officer NN	2023-02-09	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
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2023-00042	Jessica Blue	Murder	Open	1234567890	1234567890	Officer PP	2023-02-11	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00043	Karen Blue	Murder	Open	1234567890	1234567890	Officer QQ	2023-02-12	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00044	Liam Blue	Murder	Open	1234567890	1234567890	Officer RR	2023-02-13	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00045	Mia Blue	Murder	Open	1234567890	1234567890	Officer SS	2023-02-14	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00046	Natalie Blue	Murder	Open	1234567890	1234567890	Officer TT	2023-02-15	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00047	Owen Blue	Murder	Open	1234567890	1234567890	Officer UU	2023-02-16	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00048	Parker Blue	Murder	Open	1234567890	1234567890	Officer VV	2023-02-17	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00049	Quinn Blue	Murder	Open	1234567890	1234567890	Officer WW	2023-02-18	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00050	Riley Blue	Murder	Open	1234567890	1234567890	Officer XX	2023-02-19	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00051	Sophia Blue	Murder	Open	1234567890	1234567890	Officer YY	2023-02-20	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00052	Taylor Blue	Murder	Open	1234567890	1234567890	Officer ZZ	2023-02-21	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00053	Ulysses Blue	Murder	Open	1234567890	1234567890	Officer AA	2023-02-22	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00054	Vivian Blue	Murder	Open	1234567890	1234567890	Officer BB	2023-02-23	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00055	Wesley Blue	Murder	Open	1234567890	1234567890	Officer CC	2023-02-24	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00056	Xavier Blue	Murder	Open	1234567890	1234567890	Officer DD	2023-02-25	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00057	Yvonne Blue	Murder	Open	1234567890	1234567890	Officer EE	2023-02-26	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00058	Zachary Blue	Murder	Open	1234567890	1234567890	Officer FF	2023-02-27	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00059	Alice Blue	Murder	Open	1234567890	1234567890	Officer GG	2023-02-28	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00060	Bethany Blue	Murder	Open	1234567890	1234567890	Officer HH	2023-02-29	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00061	Craig Blue	Murder	Open	1234567890	1234567890	Officer II	2023-03-01	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00062	Dawn Blue	Murder	Open	1234567890	1234567890	Officer JJ	2023-03-02	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00063	Elijah Blue	Murder	Open	1234567890	1234567890	Officer KK	2023-03-03	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00064	Fiona Blue	Murder	Open	1234567890	1234567890	Officer LL	2023-03-04	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00065	Gavin Blue	Murder	Open	1234567890	1234567890	Officer MM	2023-03-05	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00066	Hannah Blue	Murder	Open	1234567890	1234567890	Officer NN	2023-03-06	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00067	Ivan Blue	Murder	Open	1234567890	1234567890	Officer OO	2023-03-07	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00068	Jessica Blue	Murder	Open	1234567890	1234567890	Officer PP	2023-03-08	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00069	Karen Blue	Murder	Open	1234567890	1234567890	Officer QQ	2023-03-09	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00070	Liam Blue	Murder	Open	1234567890	1234567890	Officer RR	2023-03-10	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00071	Mia Blue	Murder	Open	1234567890	1234567890	Officer SS	2023-03-11	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00072	Natalie Blue	Murder	Open	1234567890	1234567890	Officer TT	2023-03-12	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00073	Owen Blue	Murder	Open	1234567890	1234567890	Officer UU	2023-03-13	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00074	Quinn Blue	Murder	Open	1234567890	1234567890	Officer VV	2023-03-14	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00075	Riley Blue	Murder	Open	1234567890	1234567890	Officer WW	2023-03-15	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00076	Sophia Blue	Murder	Open	1234567890	1234567890	Officer XX	2023-03-16	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00077	Taylor Blue	Murder	Open	1234567890	1234567890	Officer YY	2023-03-17	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00078	Ulysses Blue	Murder	Open	1234567890	1234567890	Officer ZZ	2023-03-18	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00079	Vivian Blue	Murder	Open	1234567890	1234567890	Officer AA	2023-03-19	10:00 AM	1234567890	1234567890	Murder at 123 Main Street
2023-00080	Wesley Blue	Murder	Open	1234567890	1234567890	Officer BB	2023-03-20</				

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Mechanica

2.3. BEGONIA RENDER

3

Mechanics

2.3. BEGONIA RENDERS

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Figure 2.3: Begonia ISO Render

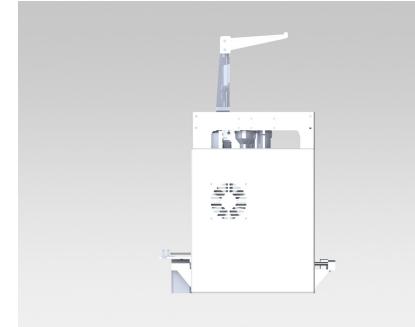


Figure 2.4: Begonia Left Rende

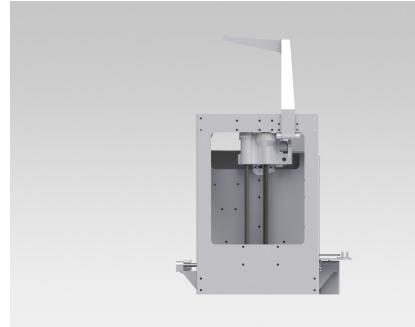


Figure 2.5: Begonia Right Render

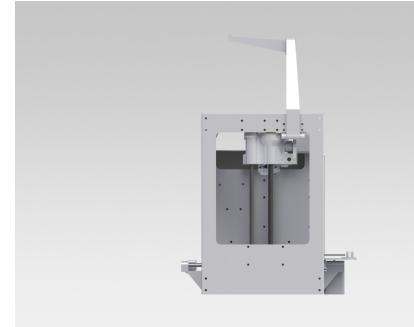


Figure 2.6: Begonia Right Render

2.3 Begonia Renders

2.3. BEGONIA RENDERS



Figure 2.2: Begonia Front Render

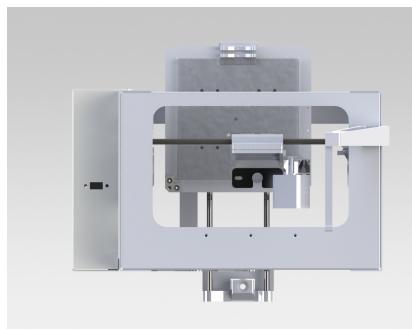


Figure 2.7: Begonia Top Render

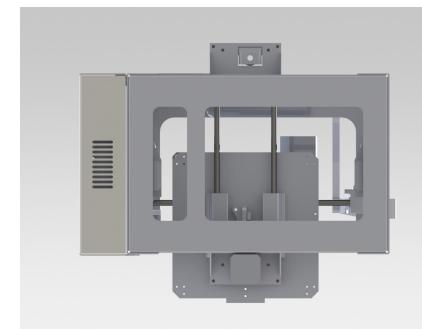


Figure 2.8: Begonia Bottom Render

2.4 Begonia 3D Printed Parts

2.5 Begonia Bed

2.5. BEGONIA BED

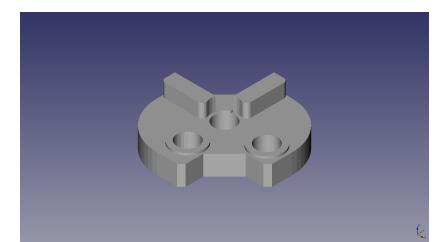


Figure 2.9: Begonia 3D Printed Bed Corner Render

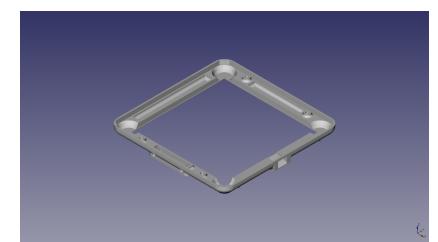


Figure 2.10: Begonia 3D Printed Bed Cover Render



Figure 2.11: Begonia 3D Printed Bed Fan Mount Render

2.6 Begonia Extruder

2.7 Begonia LCD

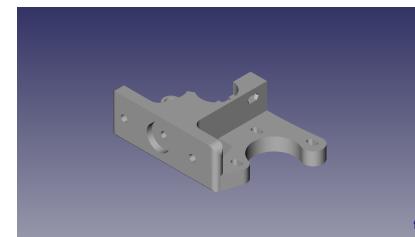


Figure 2.13: Begonia 3D Printed Extruder Body Hex Render

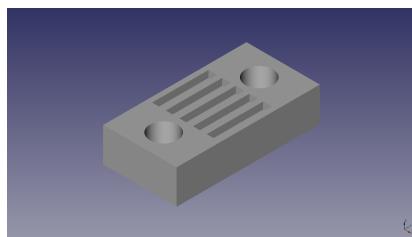


Figure 2.12: Begonia 3D Printed Belt Clamp Render



Figure 2.14: Begonia 3D Printed Extruder Mount Render

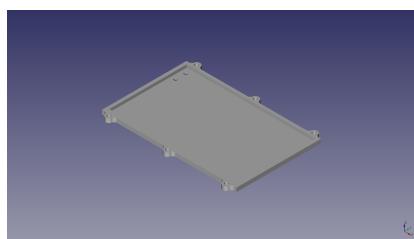


Figure 2.15: Begonia 3D Printed LCD Back Cover Render

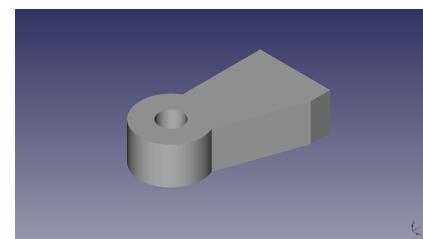


Figure 2.17: Begonia 3D Printed LCD Hinge Render

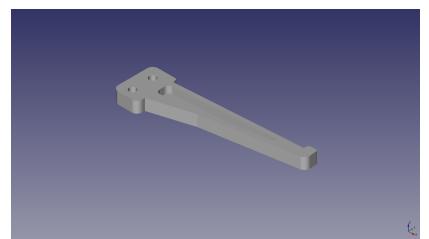


Figure 2.19: Begonia 3D Printed Spool Arm Render

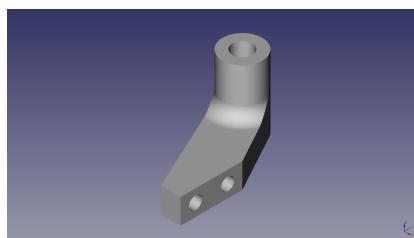


Figure 2.16: Begonia 3D Printed LCD Catch Render

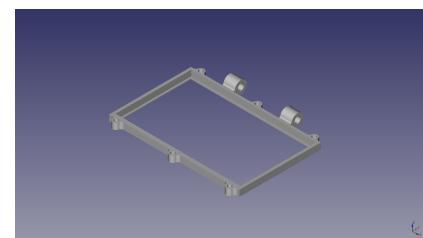


Figure 2.18: Begonia 3D Printed LCD Mount Render

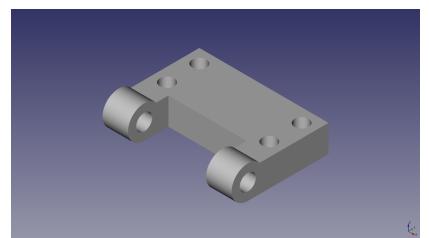


Figure 2.20: Begonia 3D Printed Spool Hinge Render

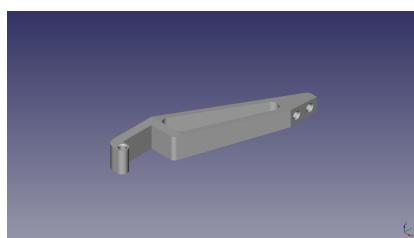


Figure 2.21: Begonia 3D Printed Spool Mount Render

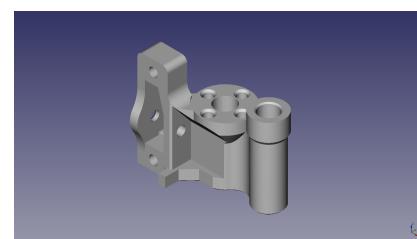


Figure 2.22: Begonia 3D Printed X End Idler Render

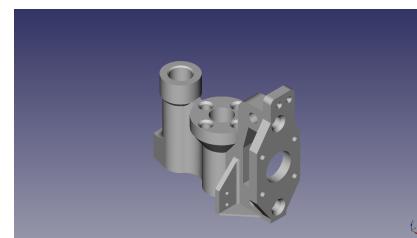


Figure 2.23: Begonia 3D Printed X End Motor Render

2.11 Begonia Z

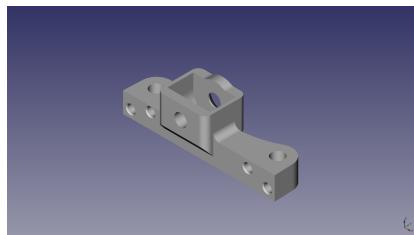


Figure 2.24: Begonia 3D Printed Y End Idler Render

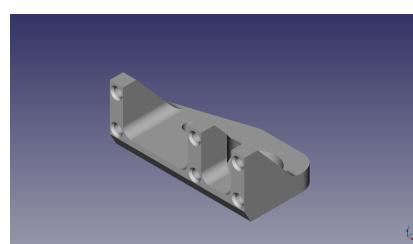


Figure 2.26: Begonia 3D Printed Upper Z Left Render

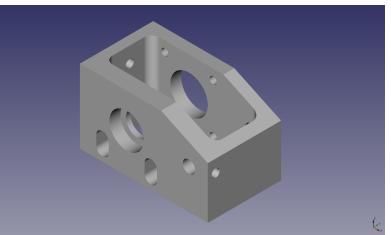


Figure 2.28: Begonia 3D Printed Lower Z Left Render

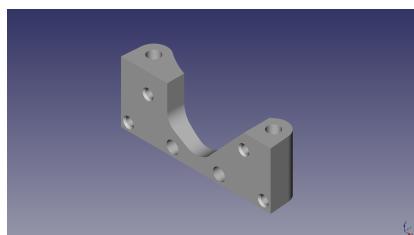


Figure 2.25: Begonia 3D Printed Y Rod Mount Render

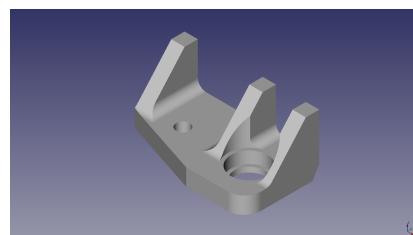


Figure 2.27: Begonia 3D Printed Upper Z Right Render

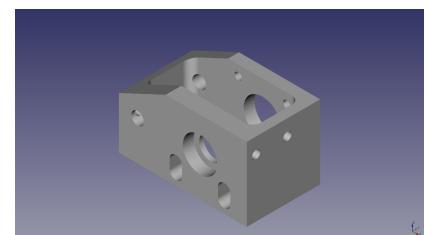


Figure 2.29: Begonia 3D Printed Lower Z Right Render

2.12 Begonia Misc

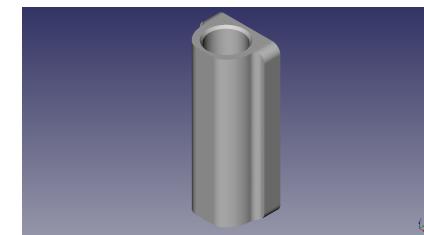


Figure 2.30: Begonia 3D Printed Double Bearing Holder Render

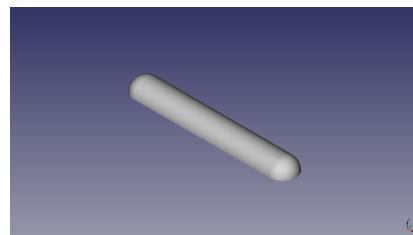


Figure 2.32: Begonia 3D Printed Handle Bar Render

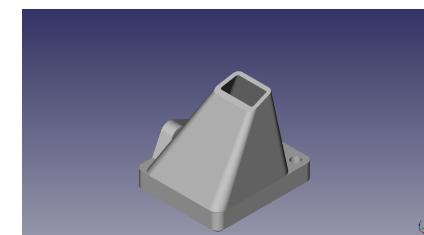


Figure 2.31: Begonia 3D Printed Fan Mount Render

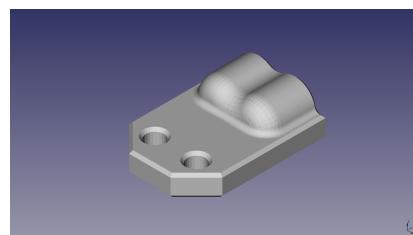


Figure 2.33: Begonia 3D Printed Cable Carrier Mount Render

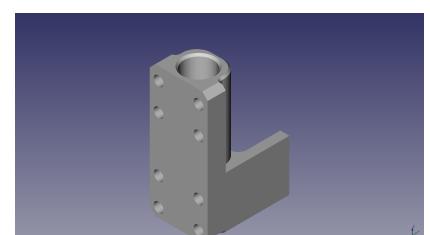


Figure 2.34: Begonia 3D Printed Extruder Mt Top Double Bearing Holder Render

- 2.13 Begonia Drawings
2.14 Camillia Drawings

- 3.1 Electrical Layout

Electrical
Power Supply, wiring

3D Printer Controller
Mini-RAMBo

4.1 Intro

The printer controller will be the RAMBo-Mini.

Contact
Phone, Email, Web, Location

5.1 Support

Email: support@alephobjects.com
Phone: +1-970-377-1111 x610
LulzBot Forum
<http://forum.lulzbot.com>

5.2 Sales

Email: sales@alephobjects.com
Phone: +1-970-377-1111 x600

5.3 Websites

Aleph Objects, Inc.
<http://www.alephobjects.com>
LulzBot 3D Printers
<http://www.lulzbot.com>

Colophon

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