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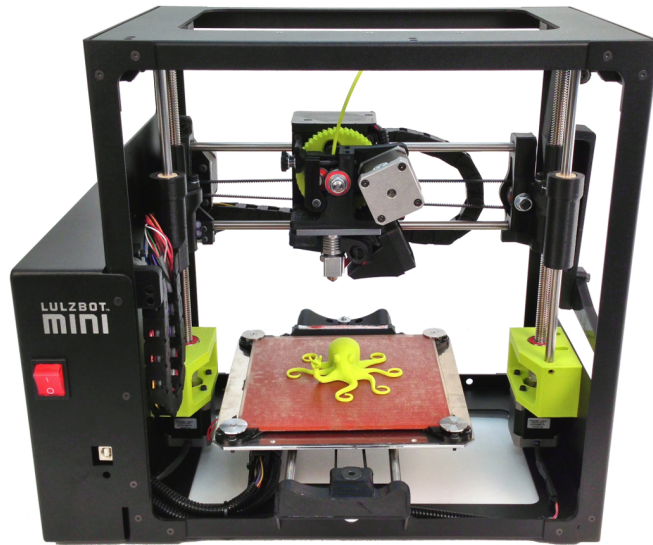
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MINI USER MANUAL



LULZBOT™
Aleph Objects, Inc.

LulzBot™ Mini User Manual

by Aleph Objects, Inc.

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WARNINGS
Safety Information

WARNING!

Read Me First!

READ THIS MANUAL COMPLETELY BEFORE UNPACKING AND POWERING UP YOUR PRINTER.

Hazards and Warnings

The Mini 3D printer has motorized and heated parts. Always be aware of possible hazards when the printer is operational.

Electric Shock Hazard

Never open the electronics case when the printer is powered on. Before removing the electronics case cover always power down the printer by completely turning off and unplugging the power cord. Allow the power supply to discharge for at least one minute.

Burn Hazard

Never touch the extruder nozzle or heater block without first turning off the hot end and allowing it to completely cool down. The hot end can take up to 20 minutes to completely cool. Never touch recently extruded plastic. The plastic can stick to your skin and cause burns. The heated bed can reach high temperatures that are capable of causing burns.

Fire Hazard

Never place flammable materials or liquids on or near the printer when it is powered on or operational. Liquid acetone and vapors are extremely flammable.

Pinch Hazard

When the printer is operational take care to never put your fingers in any moving parts including belts, pulleys, or gears. Tie back long hair or clothing that can get caught in the moving parts of the printer.

Static Charge

Make sure to ground yourself before touching the printer, especially its electronics. Electrostatic discharge can damage electronic components. Ground yourself by touching a grounded source like the metal housing or your computer case.

Age Warning

For users under the age of 18, adult supervision is recommended. Beware of choking hazards around small children.

3D Printer Software

1.1 Software Overview

Aleph Objects, Inc., the maker of the LulzBot™ Mini, completely supports free/libre hardware and software. Along with the Mini being a free/libre hardware design, it has been tested to work with 100% free/libre software. Our source code and design files are hosted on our development server found at <http://devel.lulzbot.com>. To operate your desktop 3D printer you will need to install a few software packages onto your PC. You will need a 3D printer host, an .STL to .gcode generator, and optional CAD or 3D modeling software.

1.2 Software Types

Printer Hosts

Printer Host software is used to control the 3D printer. The program not only allows you to manually move the printer along all the axes, but set temperatures manually, send commands and receive feedback/error messages from the onboard electronics. We recommend that new users start with Cura as it includes a slicing engine as well.

Common Printer Hosts:

- Cura
- Printron (Pronterface)
- MatterControl
- OctoPrint
- Botqueue

Slicers

These programs take the 3-Dimensional model (typically STL/OBJ/etc) and determine the 3D printer toolpath based on the options selected. The slicing engine uses the nozzle diameter, printing and movement speeds, layer height and other variables to determine the coordinates where it needs to move and the rates at which it will do so. This information is exported out of the program as a gcode file. The gcode file is a plain-text file with a series of text-based codes and a list of the complete X,Y and Z axis

1.3. INSTALLING DRIVERS

coordinates used for printing the 3D model. We recommend that new users start with Cura as it includes the printer host as well.

Recommended Slicers:

- Cura
- Slic3r

All of the following free/libre software packages are available for GNU/Linux, Windows, and Apple OS X. However, we highly recommend using these programs on GNU/Linux.

The required software can be found in the Support/Downloads section at LulzBot.com/support/downloads. You will also find instructions there for installing each program onto your PC. You can also find downloads specific to the LulzBot™ Mini 3D printer on the LulzBot™ Mini product page.

1.3 Installing Drivers

Linux and Mac OSX users will not need to install a driver to communicate with the Mini 3D printer. Windows users will need to install the drivers. Using Cura as your printer host and slicing software is recommended, as the drivers will automatically be installed. The drivers can also be downloaded from LulzBot.com/support/downloads. A visual guide showing the driver installation process can be found in our download section as well.

1.4 Cura

Setup Cura

Cura is available for download on our website at <https://www.lulzbot.com/support/downloads>. When installing, it is recommended to uninstall any previous versions of Cura you may have been using. When first opening Cura, you will be prompted to go through the **First run wizard**. This will consist of selecting your printer.

It is important to select the correct printer, as Cura uses custom profiles and machines settings based upon which printer you are running.

- Download the appropriate installer for your computer operating system.
- Install Cura by double clicking on the installer.
- Once your language has been selected, select **Next**.
- Select **Lulzbot Mini**.
- Once the proper printer is selected, select **Next**.

Once the installation wizard finishes you can move forward with your first print!

1.5 Quick Print Settings

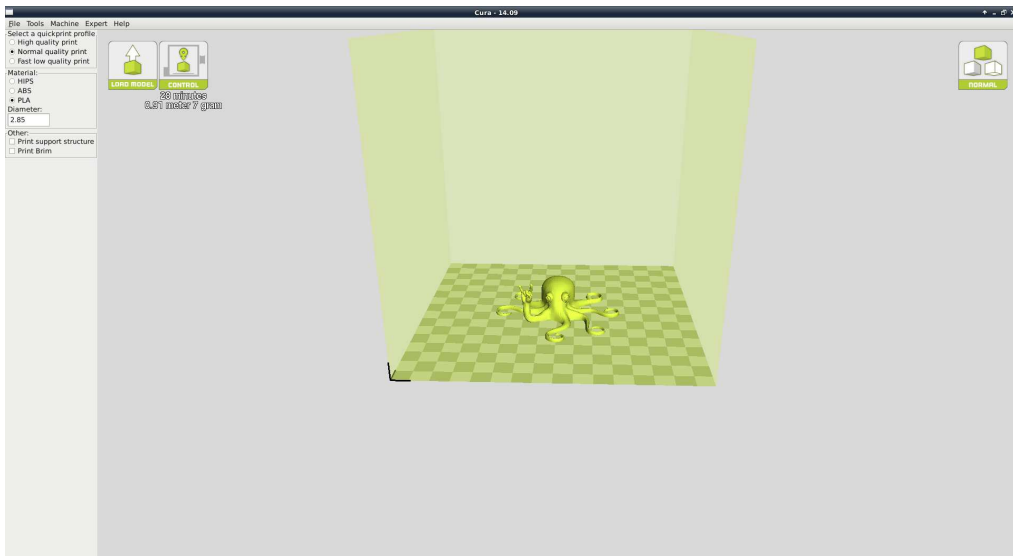


Figure 1.1: Quick Print Settings

After setting up Cura for the first time, you will be shown the main interface screen. (Fig. 1.1, page 16):

Selecting a Quick Print Profile

The print quality settings can be found in the top left-hand corner of the window. For most filaments, there will be High Quality, Normal Quality, or Fast Quality options. Some of the more exotic filaments may only have a Normal Quality profile.

High Quality

Designed to give greater detail and finer objects. This will have a smaller layer height, which will make each layer thinner, so that curves seem more natural and walls seem less noticeable. This setting will also require more layers to be laid down, increasing overall print time.

Medium Quality

Designed to give a medium resolution, by increasing the layer height and print speeds. This will make the organic curves slightly more step-like than the fine setting, but will reduce printing time.

Fast Quality

Designed for the fast prints, where overall model finish is not of concern. Most commonly used for quick iteration of designs found in rapid prototyping.

Material Selection

Choose your desired filament. The Lulzbot Mini ships with a 1 meter sample of HIPS, that should be used in your first print.

Printing Support Material

The Mini 3D printer is able to print models that have angles and overhangs, even without support material depending on the overhang distance and angle. Turn this option on if your model could benefit from support material.

Brim

Brim is used to increase surface area of the part your printing, thereby ensuring proper part adhesion. This will print a single layer high edge

around the outside of the part, helping first layer adhesion and minimizing warping.

Load Model File

Select the model you would like to print. Either use the **Load Model** button or select **File > Load Model**. Once the file has been loaded, you will see a 3D rendering of your object on the build platform. Select the model to see the various options.

Model Orientation

Move your model to change where it is printed on the build plate. Do this by left clicking on the model and dragging it to the desired location. The **black** outlined corner represents the lower left hand corner of the build plate on your printer. You can also Right Click and hold in the build screen, to view your model from different angles.

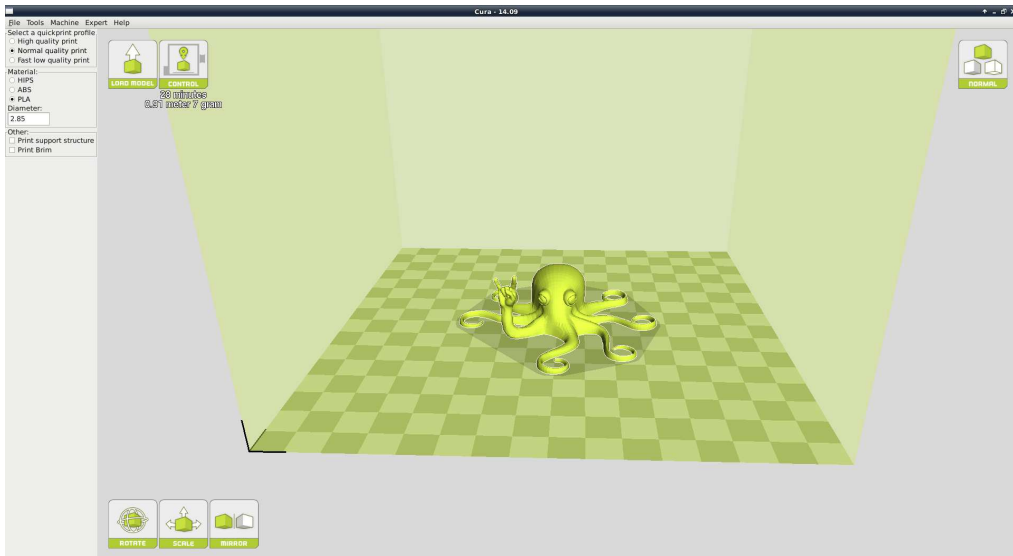


Figure 1.2: Options after selecting model

1.5. QUICK PRINT SETTINGS

Rotate

The **Rotate** button will give you the ability orient your model in along all three axes. Once you click the rotate button, three circles will surround your model. The **red circle** will allow you to rotate around the **Z axis**. The **Yellow circle** will rotate around the **Y axis**. The **Green circle** will rotate around the **X axis**.

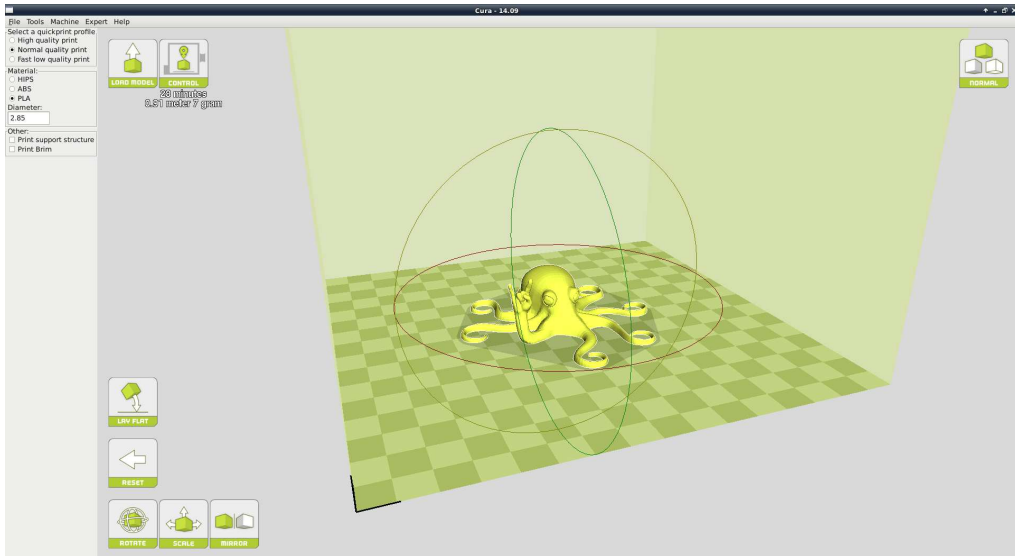


Figure 1.3: Rotating your Model

Lay Flat

The **Lay Flat** button will ensure that the flat portion of your print is securely attached to the bed. It is highly recommended to use this option after rotating your model in the Z direction, as it will help prevent adhesion issues during the print.

Reset

The **Reset** button will return your model to the original orientation as defined by the CAD program used to create the model.

Scale

The **Scale** button displays the model dimensions, along with the ability to scale along the X Y or Z axes. Anything **below** the number 1.0 will reduce the objects size, while anything **above** the number 1.0 will increase the objects size. As a default, it will be set to uniform scaling. This will cause the X Y and Z axes to be scaled by the same amount when you make a change to any of them. To disable this, select the lock in the lower section of the scaling window.

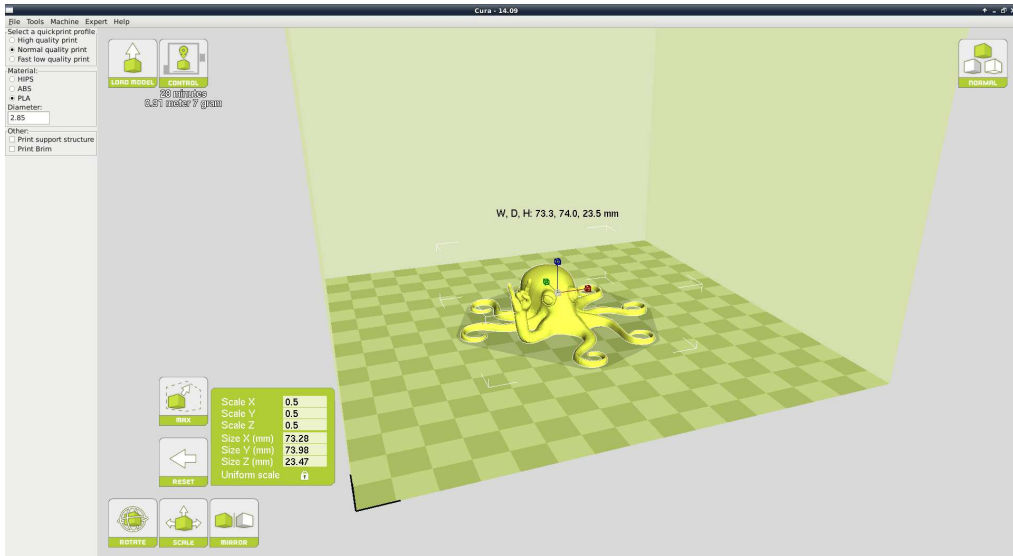


Figure 1.4: Scaling your Model

1.6 View Options

This mode allows you to view your model in a variety of different ways. This can be helpful for spotting issues before the print even starts.

Normal

This is the standard view and shows the solid outer surfaces of the model.

1.6. VIEW OPTIONS

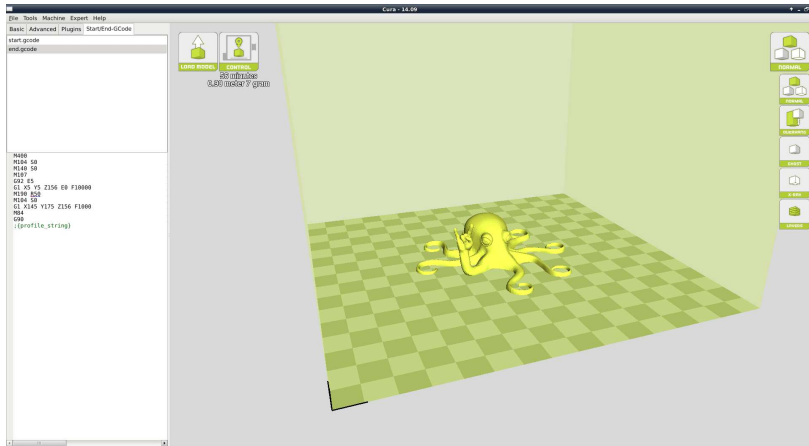


Figure 1.5: View in Normal Mode

Overhang

Overhang mode shows where your model may need support material. In Fig. 1.6, page 21 the red highlighted areas show overhangs and more severe angles and areas where support material is recommended.



Figure 1.6: View in Overhang

Ghost

Ghost view mode makes the model translucent to allow you to see what is behind it.



Figure 1.7: View in Ghost

Xray

Xray is very similar to Ghost mode. It will allow you to see into objects, ensuring that inner details are correct.

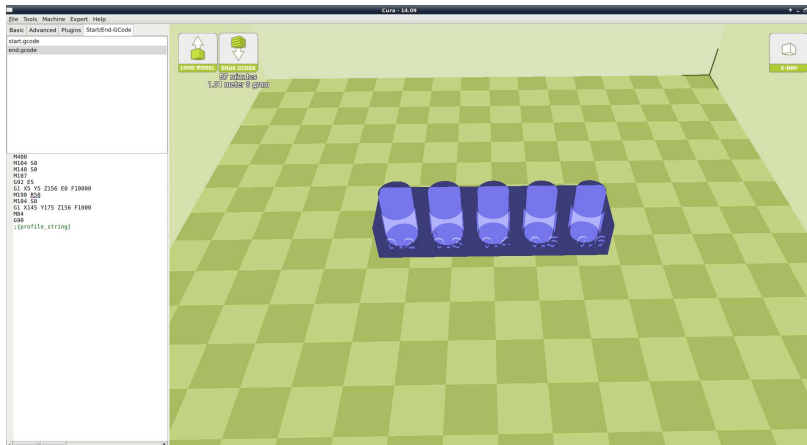


Figure 1.8: View in Xray

1.6. VIEW OPTIONS

Layers

To view the toolpath of your print head and to ensure no skipped layers or gaps use this option. Use the slide bar on the right hand side of the window to move up and down through the toolpath layers.

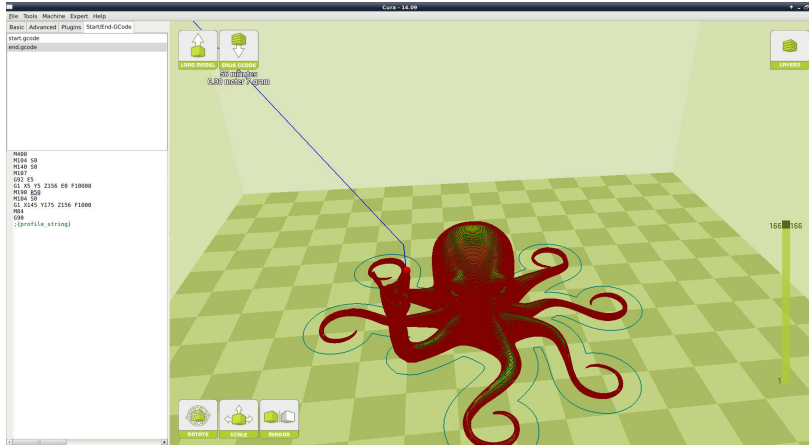


Figure 1.9: View in Layers

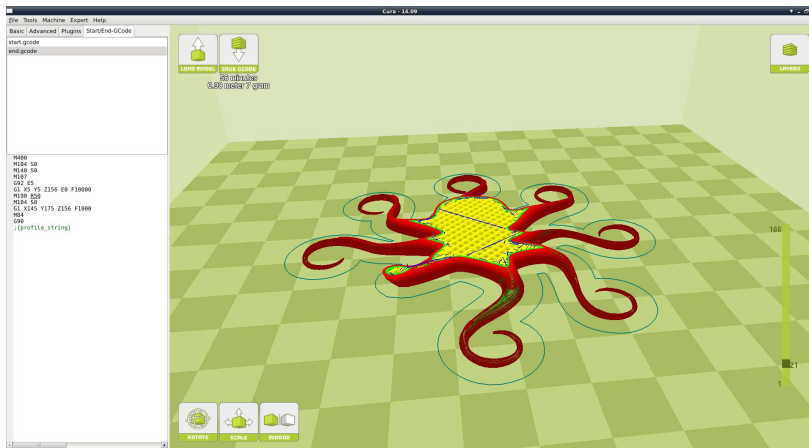


Figure 1.10: Viewing Specific Layers

1.7 Starting Your First Print

Once you have your model, profile, and filament loaded, it is time for your first print!

Control

Connect your 3D printer to a computer using a USB cable, power it on and select the **Control** button. This will bring up your Pronterface user interface. You will not be able to send any commands until the window title changes to **Operational**. As soon as it is operational, select **Print**. This will start the printing process: (set the appropriate temperatures, go through the auto-leveling procedure, and start printing your model).

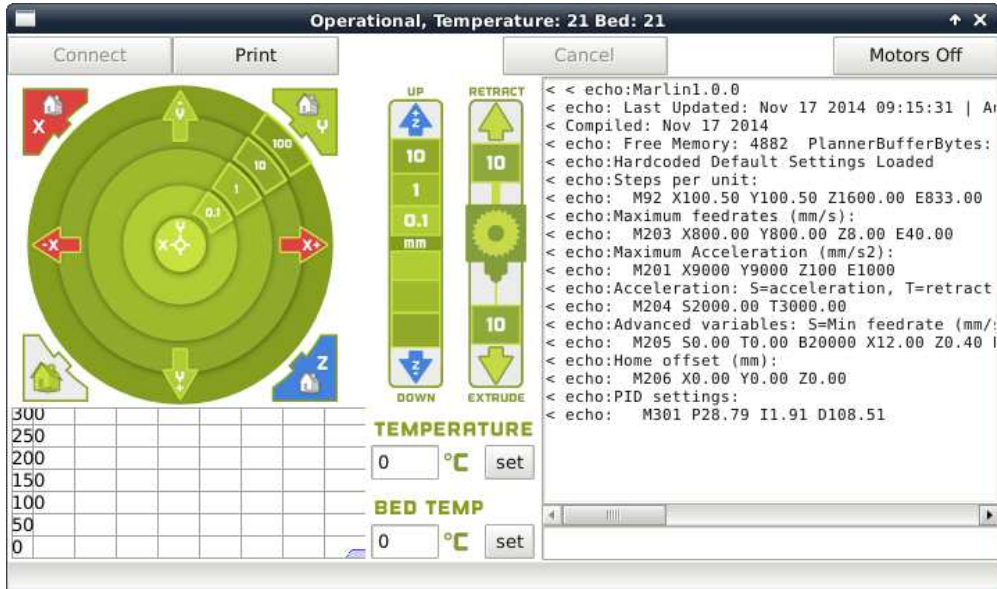


Figure 1.11: Control Screen

1.8 Removing Your First Print

After your first print has finished, you need to wait for the part to cool down. Your parts will be easier to remove if you allow your heated bed to cool down to optimal temperature. This will allow the plastic to contract,

1.9. FULL SETTINGS

making it easier to remove. Your print bed will move forward once it is ready to be removed.

Once your heated bed has cooled, use the blue handled knife that was included with your printer to remove the item. Carefully use the knife to get between your print and heated bed. Once underneath the part rotate the blade- lifting with the sharp edge into the part, to gently pop the piece off your plate.

1.9 Full Settings

Full settings should not be used until a decent amount of 3D printing experience has been acquired. The simple settings will provide good results for most models. The first time Cura is launched it will default to the Quick Print interface. In order to have more control of your slicing and Gcode generation, switch to Full Settings. Select Expert > Switch to full settings. The following tabs will now be available: Basic, Advanced, Plugins, and Start/End-Gcode. You will also have access to the Expert Settings.

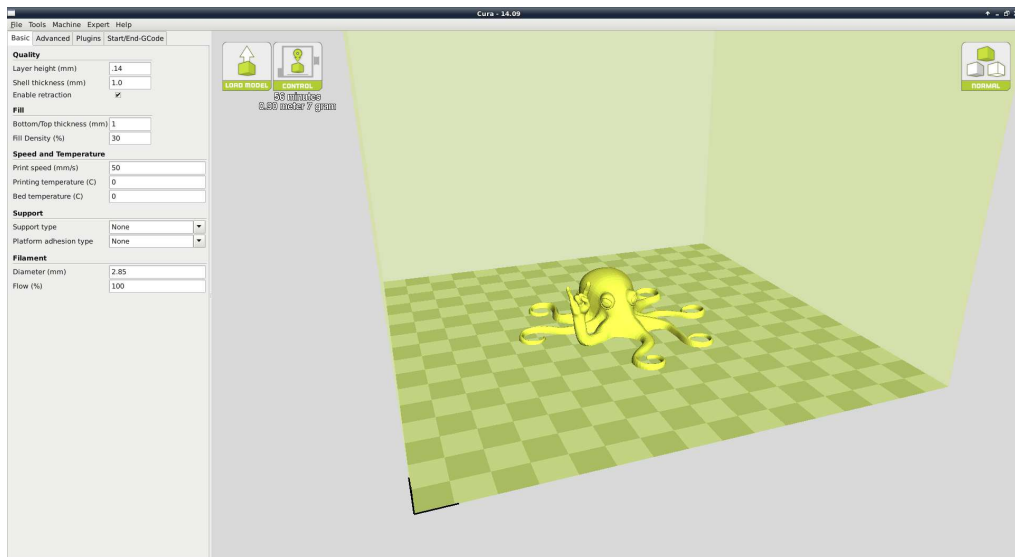


Figure 1.12: View in Full Settings