USER GUIDE

APOLLO3D SATURN10/10Plus

This guide only applicable to Apollo3D Saturn 3D printer

PREFACE

Note: Each device must be tested before leaving factory. If there are some residues in extruder or some tiny scratches on the build tape, it is normal and won't affect the printing quality.

On the completion of this User Guide, thanks all Apollo3D engineers and the Apollo3D printer users for their unremitting efforts and sincere assistance.
The Apollo3D Saturn User Guide is designed for the Saturn users to start their printing journey with Apollo3D Saturn. Even if you are familiar with earlier Apollo3D machines or 3D printing technology, we still recommend that please read this guide, as there is lots of important information about the Apollo3D for you to get a better 3D experience.
For a better and more successful printing experience, you can refer to the following materials:
(1) User Guide:
Users will find the User Guide together with the printer accessories. The User Guide will help you start your print journey as soon as possible.
(2) Official Apollo3D Website:
www.apollo3dprinting.com
The official Apollo3D website contains the up-to-date information concerning Apollo3D software, firmware, device maintenance and so on. Users are also able to get the contact information from there.

NOTICE

PLEASE STRICTLY FOLLOW ALL THE SAFETY WARNINGS AND NOTICE BELOW ALL THE TIME.

WORK ENVIRONMENT SAFETY
● Keep your work place tidy. ● Do not operate Saturn in the presence of flammable liquids, gases or dust. ● Keep Saturn out of children and untrained persons' reach.
ELECTRICAL SAFETY
● Always use the Saturn with a properly grounded outlet. ● Do not refit Saturn plug. Do not use Saturn in damp or wet locations. Do not expose Saturn to burning sun. ● In case of device damage, please use the power supply provided by Apollo3D. ● Avoid using the device during an thunderstorm. ● In case of uncertain accident, please unplug the device if you do not use it for long.
PERSONAL SAFETY
● Do not touch the nozzle and build plate during printing. ● Do not touch the nozzle after finishing printing. ● Dress properly. Do not wear loose clothing or jewelry. Keep your hair, clothing and gloves away from moving parts. ● Do not operate the device while you are tired or under the influence of drugs, alcohol or medication.
CAUTIONS
● Do not leave the device unattended for long. ● Do not make any modifications to the device. ● To lower the build plate before loading/unloading filament. ● Operate the device in a well-ventilated environment. ● Never use the device for illegal activities. ● Never use the device to make any food storage vessels. ● Never use the device to make any electrical appliance. ● Never put the model into your mouth. ● Do not remove the models with force. ● Never connect the device with network cable longer than 3m.
ENVIRONMENT REQUIREMENTS
● Temperature: RT 15-30°C ● Moisture: 20%-70%
PLACE REQUIREMENTS
● The device must be placed in a dry and ventilated environment. The distances of the left, right and back side space should be at least 20cm, and the distance of the front side space should be at least 30cm.

FILAMENT REQUIREMENTS
● Do not abuse the filament. Please make sure you use the Apollo3D filament or the filament from the brands accepted by Apollo3D.
FILAMENT STORAGE
● All polymers degrade with time. Do not unpack until filament is needed. Filament should be stored at clean and dry conditions.
LEGAL NOTICE
● All the information in this document is subject to any amendment or change without the official authorization from Apollo3D. ● APOLLO3D CORPORATION MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRATIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Apollo3D shall not be liable for errors contained herein for incidental consequential damages in connection with furnishing, performance or use of this material. ● Apollo3D reserves the right to modify the User guide due to subsequent equipment updates. ● Copyright © 2020 Apollo3D Corp. All Rights Reserved
FCC STATEMENT
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference (2) This device must accept any interference received, including interference that may cause undesired operation. ● Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. ● This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant · to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: ■ Reorient or relocate the receiving antenna. ■ Increase the separation between the equipment and receiver. ■ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. ■ Consult the dealer or an experienced radio/TV technician for help. ■ This document contains proprietary information protected by copyright.

SERVICE

Always unplug Saturn from its power before performing any service procedures. Failure to do so may result in personal injury and equipment damage.
Use only Apollo3D approved materials and components. Use of object materials, or 3D objects other than Apollo3D approved object materials and genuine Apollo3D components may void warranty.

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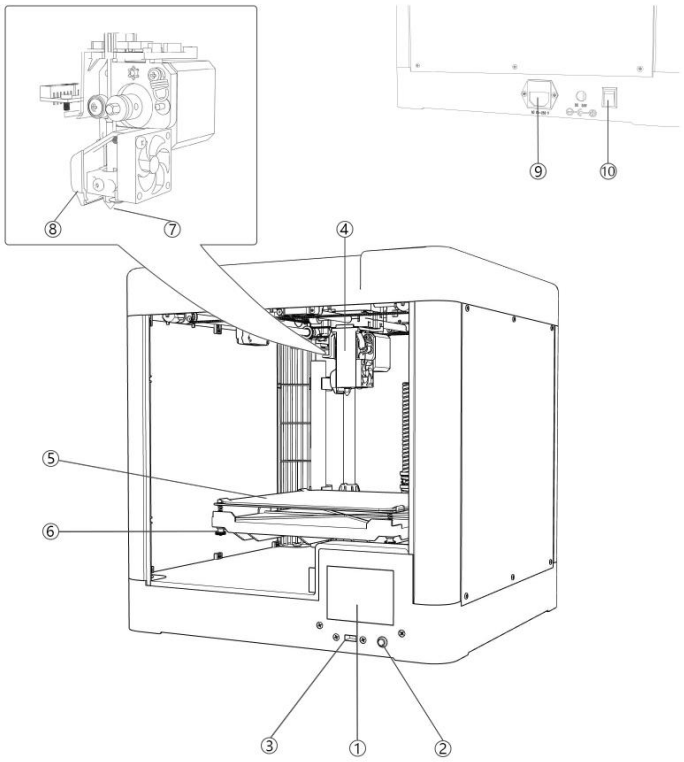
1.Introduction

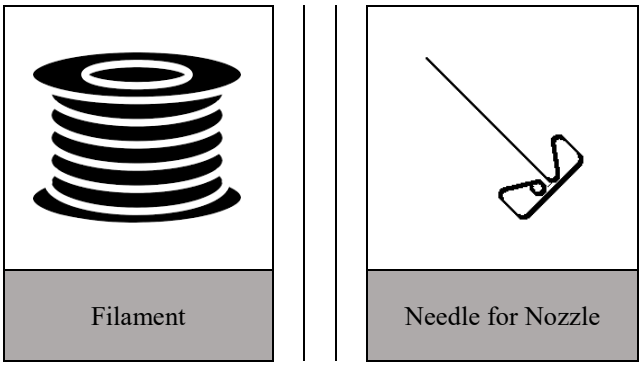
Saturn10 used
push-bottom

Saturn10 plus
used touch screen



1.Touch screen	4.Extruder	7.Nozzle	10.Power switch
2. Reset	5.Build Plate	8.Extruder Fan	
3. USB stick input	6.Leveling Nut	9.Power input	

1.1 Accessories



1.2 Product Parameters

Name	Saturn 10/10 plus
Print Technology	Fused Deposition Modeling (FFF)
Build Volume	190 x 190 x 150mm
Layer Thickness	0.05mm~0.4mm
Nozzle Diameter	Standard 0.4mm, can be in 0.2, 0.3, 0.5mm
Model Materials	1.75mmPLA, ABS, carbon fiber, etc
Product SIZE & WEIGHT	370 x 380 x 388mm/8.5kg
Package SIZE & WEIGHT	445 x 435 x 460mm/8.9kg
Power Requirements	100-240V, 50-60Hz
Connectivity	USB Stick by Saturn 10 / SD card by Saturn 10 plus
Print File Type	Gcode

1.3 Terms

Build Volume	The three dimensional amount of space that an object will use once it is completed.
Extruder	The device that draws the filament from the spool, melts it and pushes it through a nozzle into the build plate.
Leveling Nuts	Nuts under the build platform that are used for adjusting the distance between the nozzle and build plate.
Extruder	The device that draws the filament from the spool, melts it and pushes it through a nozzle into the build plate.

Scraper	A tool that used for picking up your printed object.
Needle for Nozzle	A tool that used for Conducting residual filament. you have to adjust the extruder temperature up to 190℃.
Allen Wrench and Sleeve	A tool that used for seizing the nozzle's metal cube.
PTFE Tube	A material that help the filament load or unload to your 3D printer.
Grease	Make 3D printer's X-axis, Y-axis, Z-axis smooth.
Glue Stick	A solid adhesive used for making the model stick to the build plate firmly.
Nozzle	Also called "print head", which located at the bottom of the extruder where heated filament is squeezed out.

1.4 Unpacking

1.5 other

1) accessories are not included in the warranty terms;
2) All printing materials are sealed and cannot be returned or replaced after the sealed package is opened;
3) This product can only guarantee the quality of the printing consumables provided by itself. If you use other consumables to cause printer failure, please contact the consumables provider to solve the problem.

2.First Installation

2.1 Leveling

To actually level the heat-bed is really simple, it just takes some practice to get it right.
(1) Start by tightening down all the screws so you have more room to work with.
(2) Home to Z minimum, then send it to Z 0 manually, the Z parameter is 0 in the touchscreen.
(3) Use the touch screen to move X-axis and Y-axis for top left (point 20,20), bottom left (point 160,20), top right (point 20,160) and bottom right (point 160,160), one leveling one point.
(3) Jog the printer above each screw, putting a piece of paper between the nozzle and the heat-bed.
(4) Loosen the screw until the paper is getting squished between the nozzle and the heat-bed only slightly. You want the still be able to move it, but feel a little bit of resistance to it.
(5) Repeat this step for each point and screw.
When you start your next print, have it start with 10 skirt lines. You don't need this every time, but it's helpful to be able to adjust the screws and see where you need to loosen or tighten the screws to get a better first layer.

1. tighten all bed levelling knobs until springs are compressed half way. Be sure to tighten each gradually so you dont bend your bed. You can eyeball how much thread is sticking below the knob to get them equal if you have this type of set up.

2. home **to Z minimum**. If your nozzle is not touching your build surface, adjust your z-stop limit switch and re-home until it is just touching your build surface when you home.

3. once your nozzle is touching your build surface at home, follow a correct bed leveling program to then level and set gap correctly. If you follow these steps you will have a level bed with correct compression on bed springs for a more rigid set up.

2.2 loading and Unloading filament

2.2.1 Loading Filament

(1) Preheat
A) Saturn10: Wait for the extruder to heat: Use the push bottom to select [Prepare]—[Preheat PLA] or [Preheat ABS] (depend on your filament type)—[Preheat PLA End] or [Preheat ABS End].

B) Saturn10P: Wait for the extruder to heat: Use the touch screen to select [Preheat]—[Add], Set Extrusion temperature at 190 ° C.

(2) Put in Filament

A) Saturn10: Waiting a moment for temperature up to 180 ° C above, Use the push bottom to select [Prepare]— [Move axis]—[Extruder]— [Move 10mm], Add by Clockwise knob, set about 50-100mm, Ensure the length can be smoothly threaded.

B) Saturn10P: Use the touch screen to select [Extrusion]—[Add], Set about 50-100mm, Ensure the length can be smoothly threaded.

(3) Cut the end of your filament to create a clean edge.

(4) Grasp the top of the extruder assembly and push the filament into the extruder's loading tube until you can feel the motor pulling the filament in.

(5) Wait until you see plastic emerging from the extruder nozzle before pressing the control panel dial to finish the filament load process.

(6) Fit the filament guide tube securely into the extruder's loading tube.

NOTE: Be very CAREFUL as the extruder can be very HOT!!!

2.2.2 Unloading filament

(1) Saturn10:

- Wait for the extruder to heat: Use the push bottom to select [Prepare]—[Preheat PLA] or [Preheat ABS] (depend on your filament type)—[Preheat PLA End]or [Preheat ABS End].
- Waiting a moment for temperature up to 180 ° C above, Use the push bottom to select [Prepare]—[Move axis]—[Extruder]—[Move 10mm], reduce by anti-clockwise knob, set about 50-100mm, Ensure the length allows the filament to be drawn out.

(2) Saturn10P:

- Wait for the extruder to heat: Use the touch screen to select Preheat—Add, Set Extrusion temperature at 190 ° C.
- Use the touch screen to select Extrusion—Eec, Set about 50-100mm, Ensure the length allows the filament to be drawn out.

NOTE: Be very CAREFUL as the extruder can be very HOT!!!

3.Operation

3.1 Filament

3.1.1 Filament Compatibility

Saturn is equipped with patent extruder, which is suitable for PLA, ABS, PETG, Nylon.

While Saturn is adopted with open type filament system, we still suggest using Apollo3D filament. All the Apollo3D filament is tested professionally, and are possessed of optimized configuration files, which ensures perfect print effect.

3.1.2 Print Setting

Each type of filament needs different setting for best print effect.
If using prepared models of Apollo3D, setting completed automatically under the circumstance of choosing correct extruder and filament.
For better adhesiveness of print product, we suggest applying a thin layer of glue before printing.
Adaptability of filament parameters: Different filament brands have different filament characteristics. When using Saturn, it is recommended to use expert mode to find a suitable parameter to ensure better printing quality.

- Thickening and increase flow rate of the first layer are beneficial to the adhesion.
- When printing small models (or environment temp is higher than 25 degree) with PLA: suggest to set platform temperature to 45 degrees.
- When printing big models (or environment temp is lower than 10 degree) with PLA: suggest to set platform temperature to 60 degrees.

3.2 Print Start-up

(1) Saturn10:
Please complete the leveling, loading correctly with the guidance of User Guide at first print.

- Print from SD Card

Tap [Print from SD], choose printed files saved in internal SD Card already.

(2) Saturn10P:
Please complete the leveling, loading correctly with the guidance of User Guide at first print.

- Print from SD Card

Tap[Tools]- SD Card icon on the touch screen, choose printed files saved in internal SD Card already.

- Print from USB stick

Tap[Tools]-USB stick icon on the touch screen, choose printed files saved in USB stick already.

We provide you a Test model in our website to print right now.

3.3 Model Removal

Warning! Be careful of your body position when using manual tool to remove the model from build plate. Sudden tool slippage and improper body position may cause injury.
Caution: Do not scratch build plate when removing the model. Scratches in build plate will cause modeling errors.

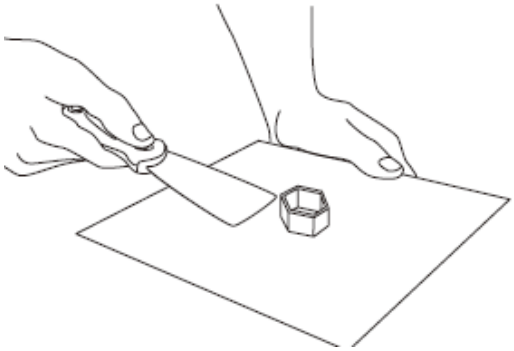
- Model cooling

Let build plate and model cool down themselves when printing without using glue stick, you can remove model easily from build plate.

- Use scraper

Remove model with a scraper when model still attached to the build plate after cooling. Keep the scraper parallel to build plate, and insert it into model bottom, you can remove model successfully.

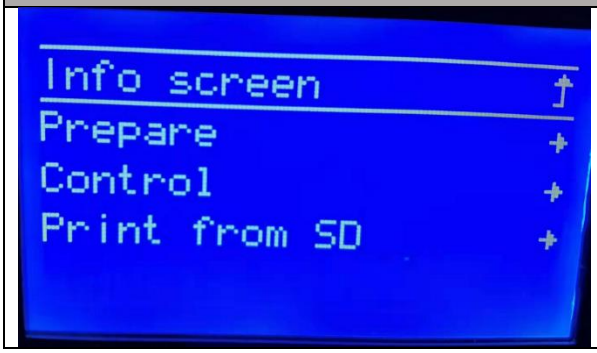
If necessary, remove build plate from the printer, then remove model from build plate with a scraper.

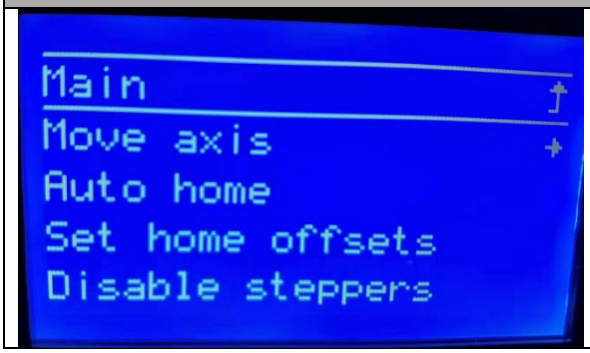


- Use water

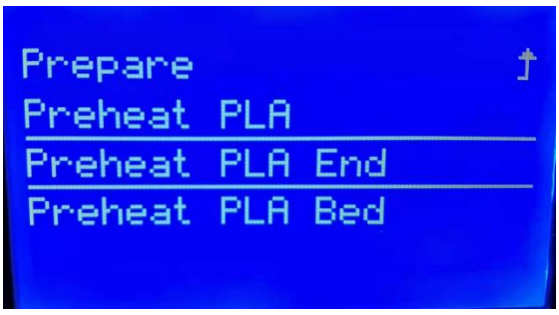
If glue stick is used when printing, and neither of above methods is effective, wash build plate with warm water to dissolve the glue after taking build plate from the printer.

4.Introduction of Touch Screen-Saturn10

Main	
	Info screen: the information of your printing. Prepare: Move axis, Auto home, Set home offsets, Disable steppers, Preheat PLA, Preheat ABS. Control: Temperature, Motion, Filament, Restore failsafe, Print from SC:

Prepare-1	
	Main: back to homepage. Move axis: Increase/ Reduce the distance from the x-axis/y-axis/z-axis to the origin. Auto home: x-axis/y-axis/z-axis to the origin.

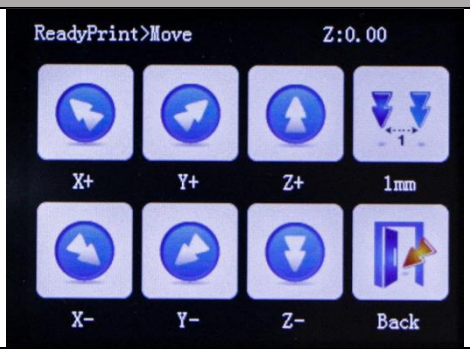
Prepare-2	
	Preheat PLA: the PLA filament you upload or download. Preheat ABS: the PLA filament you upload or download.

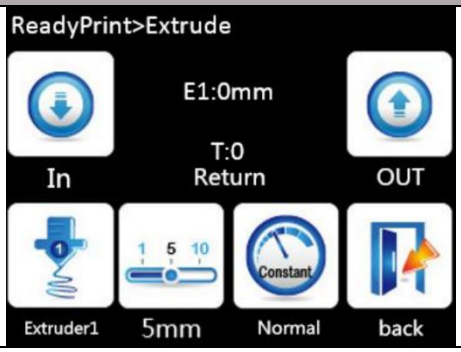
Prepare PLA	
	Preheat PLA: Control the temperature both of extruder and hotbed. Preheat PLA End: Control the temperature of extruder. Preheat PLA: Control the temperature of hotbed.

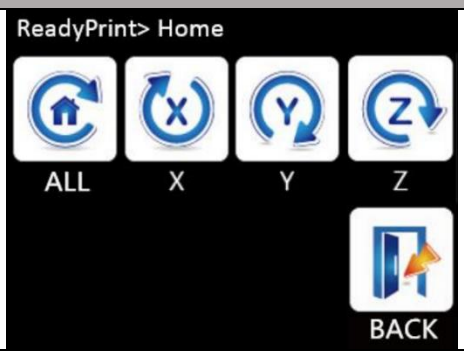
4.Introduction of Touch Screen-Saturn10P

Ready Print	
	**homepage** Preheat: set the extruder or heat-bed temperature. Move: move X-axis/Y-axis-Z-axis. Home: Printer zeroing. Printing: select what you want to print. Extrusion: load/ unload the filament. Leveling: leveling the heat-bed. Settings: Option. More: N.A.

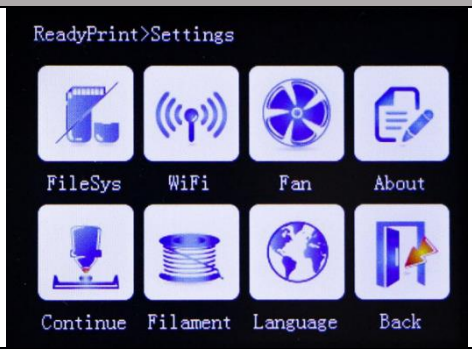
Preheat	
	Add: Set temperature up. Des: Set temperature down. Extruder: Set Extruder temperature. 10°C: Set heat-bed temperature. Back: back to homepage.

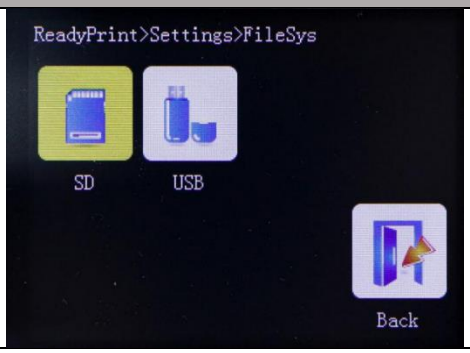
Move	
	X+/ Y+/Z+: Increase the distance from the x-axis/y-axis/z-axis to the origin. X-/Y-/Z-: Reduce the distance from the the x-axis/y-axis/z-axis to the origin. 1mm: parameters of increased or reduced. Back: back to homepage.

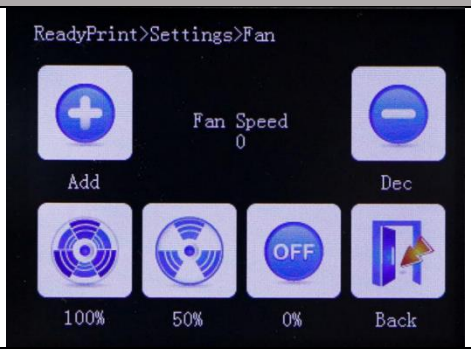
Extrusion	
	In: load filament in to 3D printer. OUT: unload filament. Back: back to homepage.

Home	
	All: x-axis/y-axis/z-axis to the origin. X: x-axis to the origin. Y: y-axis to the origin. Z: z-axis to the origin. Back: back to homepage.

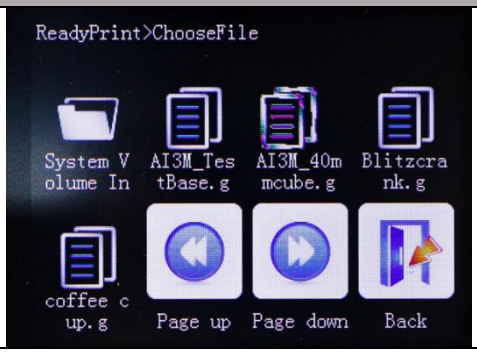
Leveling	
	

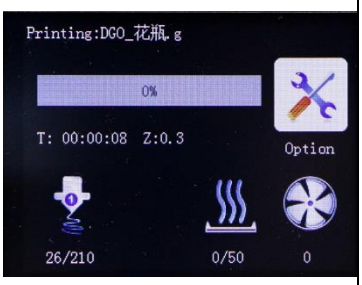
Setting	
	FlieSys: select the storage type(SD/USB) WIFI: N.A. Fan: set the speed of fan. Continue: N.A. Filament: Language: Set different language. Back: back to homepage.

FlieSys	
	SD: Use SD card USB: Use USB stick. Back: back to homepage.

Fan	
	Add: Increase fan speed. Dec: Reduce fan speed. Back: back to homepage.

language	
	Set different language.

ChooseFile	
	Touch  . Select your 3D model to print.

Printing/Operation/Pause		
		

5.Slicer software suggestion

The process that ignites 3D printing innovation is comprised of a few essential tools. Obviously, you have the 3D model and the 3D printer, but there's an instrumental piece to the puzzle right in between those two points. 3D printing slicer software essentially acts as the middleman between the 3D model and printer.

For those who don't know, a 3D printing slicer prepares the selected model for your 3D printer, generating G-code, which is a widely used numerical control (NC) programming language. There is a large number of slicing software out there, many of which are free. To help you find the perfect fit, here's a list of the top 3D printing slicer software tools.

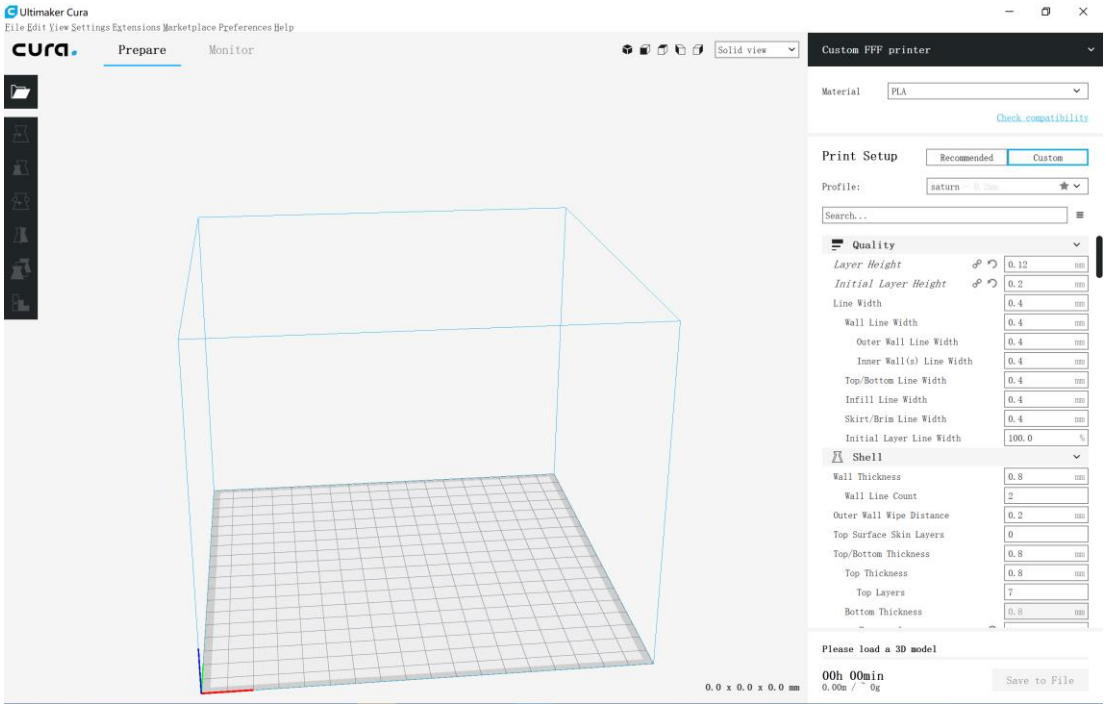
Software	User	Price	OS
Cura	Beginners, Advanced Users	Free	Windows
PrusaSlicer	Beginners, Advanced Users	Free	Windows, Mac, Linux
OctoPrint	Intermediate Users, Advanced Users	Free	Raspberry Pi, Windows, Mac, Linux
Simplify3D	Beginners, Advanced Users	$150	Winodows, Mac
MakerBot Print	Beginners	Free	Windows, Mac
Repetier	Intermediate Users, Advanced Users	Free	Windows, Mac, Linux
IdeaMaker	Beginners, Advanced Users	Free	Windows, Mac, Linux
Z-Suite	Beginners	Free	Windows, Mac
Slic3r	Advanced Users, Professional Users	Free	Windows, Mac, Linux
IceSL	Advanced Users	Free	Windows, Linux
SliceCrafter	Advanced Users	Free	Browser
Astroprint	Beginners, Advanced Users	Freemium	Browser, Raspberry Pi, pcDuino
CraftWare	Beginners, Advanced Users	Free	Windows, Mac, Linux
3DPrinterOS	Beginners, Advanced Users	Freemium	Browser, Windows, Mac
SelfCAD	Beginner, Advanced Users	Free trial, $9.99/month	Browser
Tinkerine Suite	Beginners	Free	Windows, Mac

Apollo3D printer could apply all of the slicer software, there is a suggestion of introduction for **Cura** slicer software.

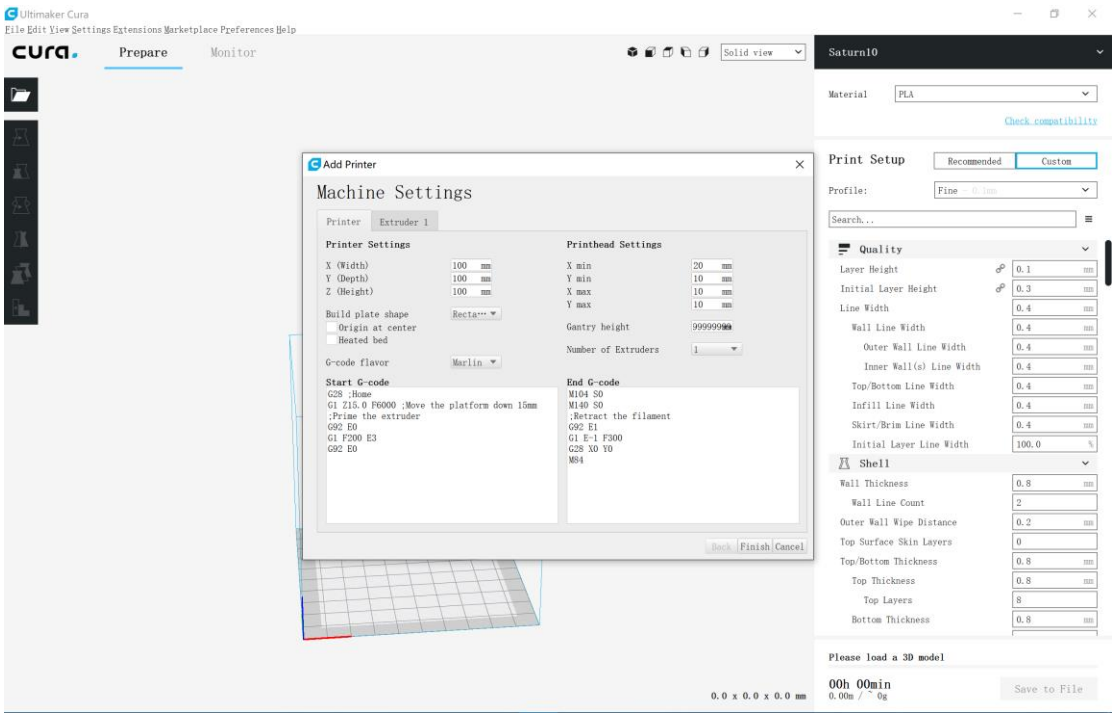
5.1 Installation and Setting

(1) Software Acquisition: To get the installation package from our linked.

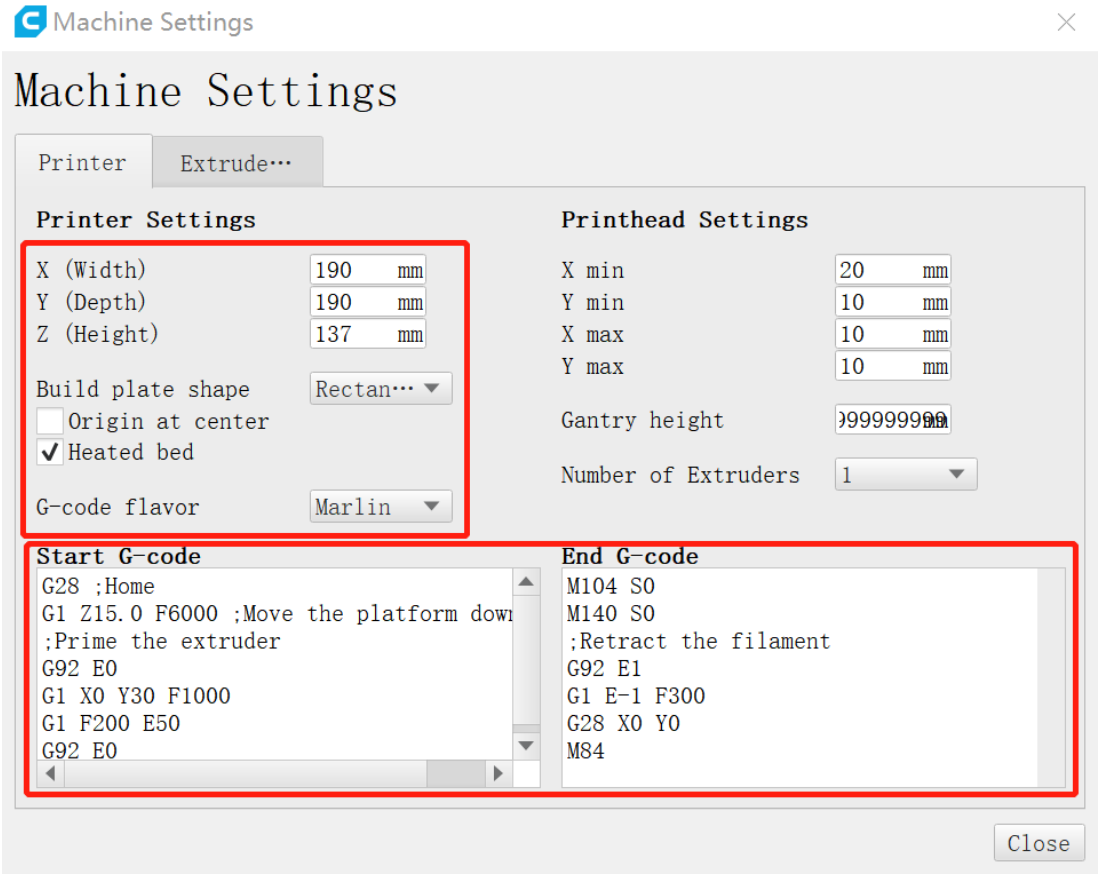
(2) Software Installation and start-up:

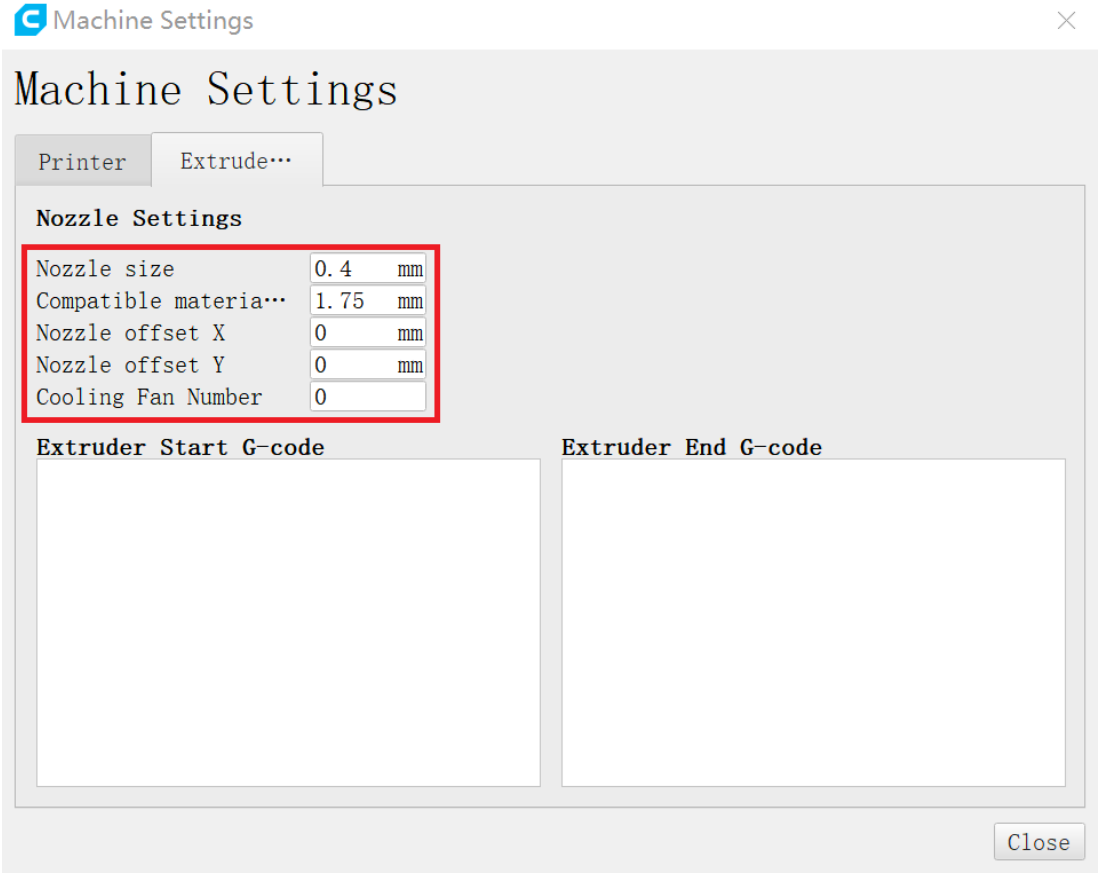


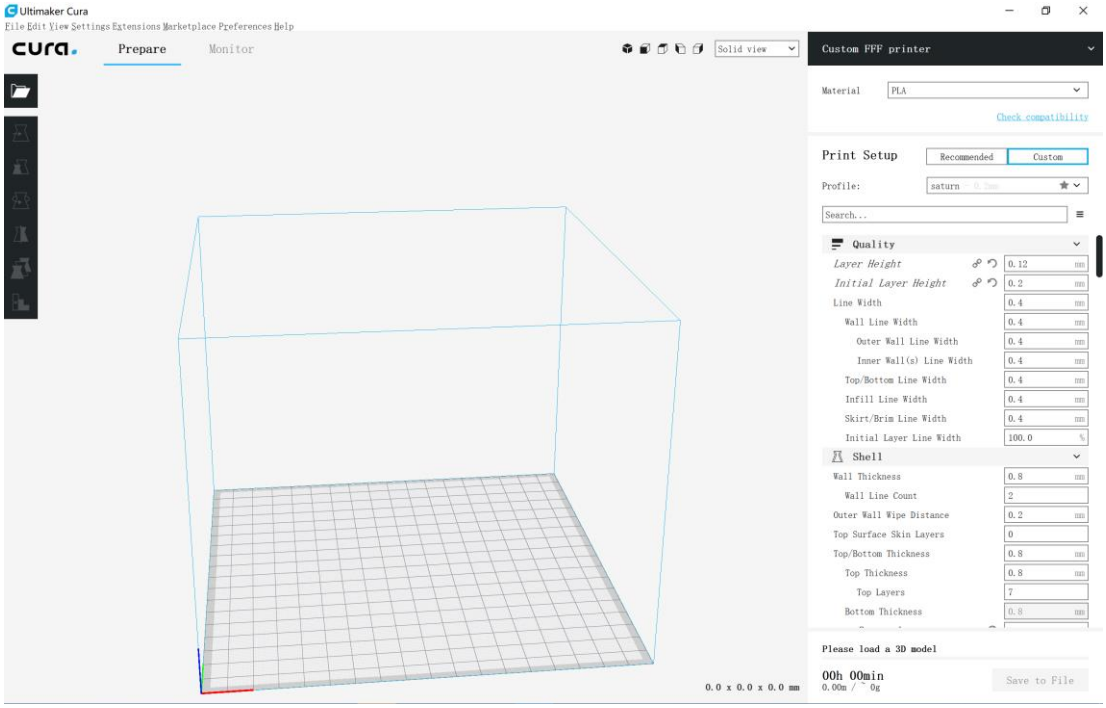
Settings—Printer—Add Printer—Custom—Insert your 3D printer name, such as Saturn.



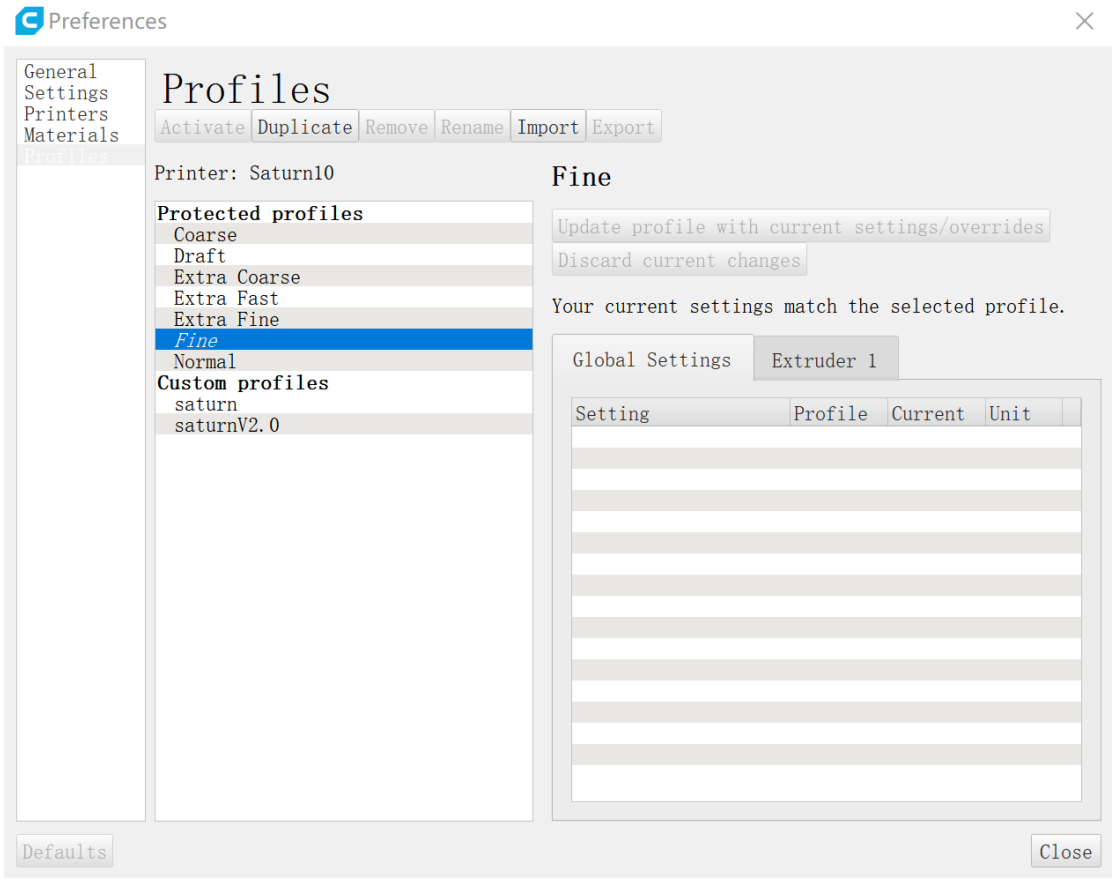
Printer and Extruder1 setting parameters as the picture below.


Machine Settings
Machine Settings
Printer
Extrude···
Printer Settings
X (Width) 190 mm
Y (Depth) 190 mm
Z (Height) 137 mm
Build plate shape Rectan···
Origin at center
Heated bed
G-code flavor Marlin
Printhead Settings
X min 20 mm
Y min 10 mm
X max 10 mm
Y max 10 mm
Gantry height
Number of Extruders 1
Start G-code
G28 ;Home
G1 Z15.0 F6000 ;Move the platform dow
;Prime the extruder
G92 E0
G1 X0 Y30 F1000
G1 F200 E50
G92 E0
End G-code
M104 S0
M140 S0
;Retract the filament
G92 E1
G1 E-1 F300
G28 X0 Y0
M84
Close


Machine Settings
Machine Settings
Printer
Extrude···
Nozzle Settings
Nozzle size 0.4 mm
Compatible materia··· 1.75 mm
Nozzle offset X 0 mm
Nozzle offset Y 0 mm
Cooling Fan Number 0
Extruder Start G-code
Extruder End G-code
Close



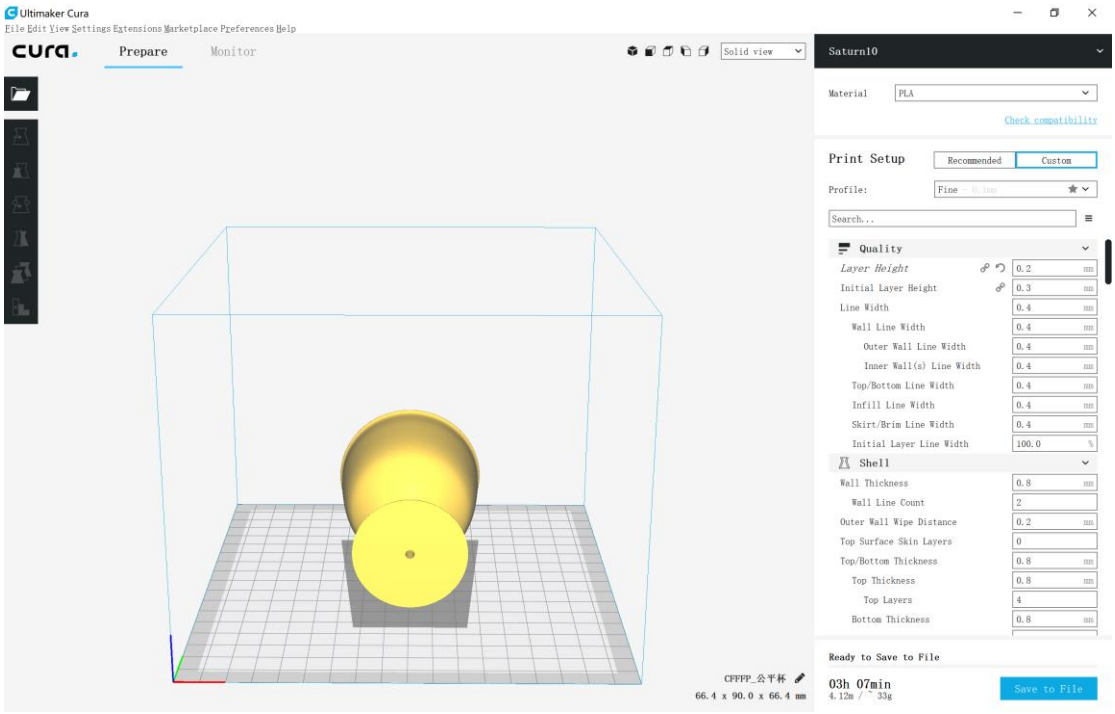
Settings—Printer—Mange Printers.



Profiles—Import—“Saturn10.curaprofile”

Saturn10.curaprofile :To get the file from our linked.

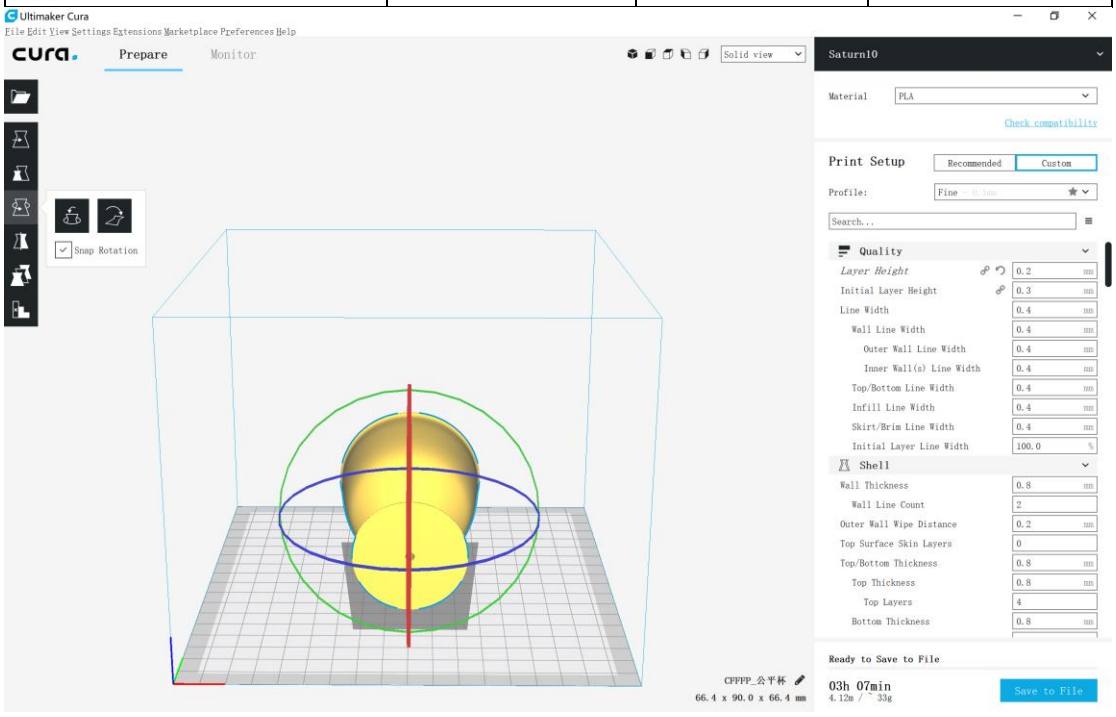
5.2 Save to File



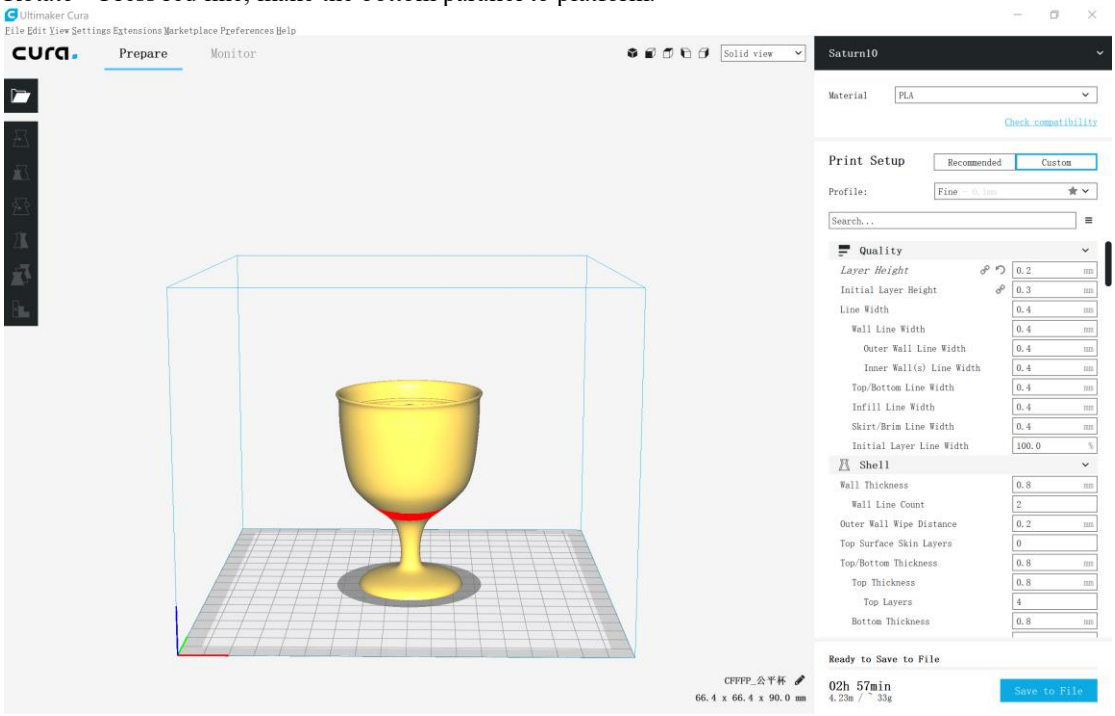
File—Open Files: select your 3D model, STL Type.

All free 3D models download from online. To help you find the perfect fit, here's a list of the top 3D printing 3D models.

Site	Type	Price	3D Printable Models
https://www.thingiverse.com/	Repository	Free	★★★★★
https://cults3d.com/	Marketplace	Free, Paid	★★★★
https://www.myminifactory.com/	Marketplace	Free, Paid	★★★★



Rotate—Press red line, make the bottom parallel to platform.



Save to file, and insert your USB stick or SD card to your 3D printer.

6.Maintenance

6.1 Maintenance and Service

Problem	Cause	Corrective Action
Extruder head building off center.	The device has lost track of extruder's exact location and is failing to build.	Send the extruder to the home position will recalibrate Saturn. Cancel your object, clear build plate, send the extruder to the home position, and restart the object.
PLA is not extruding or sticking to the build tape properly.	This can be caused by the build plate not being leveling with the extruder head.	Leveling the build platform will align the extruder head and ensure a better object quality. Cancel your object, clear build platform, level the build platform, and restart the object.
Saturn froze before my object started.	Saturn may have received contradictory commands.	Turn power switch off, wait 30 seconds, and turn power switch on.
Spaghetti mess at end of build.	A layer of your object did not stick properly, model was saved with minimal surface area contacting the build platform, or object was built floating above the build platform with no support selected. Z axis offset may not be correct and the extruder tip is not properly spaced with the build platform.	Use the preview feature in your slicing software to see the first layer height and position. Build with supports when necessary. Contact customer service on how to calibrate the Z axis Offset.
Part only built halfway.	Filament ran out. Filament clogged during build.	Replace filament and resume build. See "No filament coming out".
No filament coming out.	Clogged extruder. Filament not properly loaded.	Contact customer service. Try running a lament change again to ensure the extruder gears have properly caught the lament.
Extruder will not home.	Limit switch wire failure.	Contact customer service.
Stringy or fraying plastic layers on steep overhangs.	Object overhangs are too far apart or too steep (Less than 45 degree angle).	Build with supports.

6.2 Extruder Unclogging

1. Tap[Preheat], set heating temperature, then go back.
2. Tap[Tools]-[Filament]-target extruder[loading], wait for extruder to heat up. As filament starts to purge, insert the unclog tool into the extruder intake (top).
3. Clogged debris will be pushed down and will extrude from the extruder tip. You should push the unclog too all the way down to ensure all filament is purged. You do not need to push with excessive force, as this may damage the extruder.

6.3 Daily Maintenance and Use Suggestion

1. Please cover the top to prevent the device from falling into dust when not using the device. If the device has not been used for a long time, it is recommended to use the original packaging.
2. Grease moving parts regularly. For frequent users, add grease at least once every three months; For long-term nonusers, add grease at least every six months.
3. Please clean residue and other sundries in time after printing completed, avoid sundries falling affecting device use.
4. Whenever possible, it is best to locate your object in the center of the build platform. Using the best orientation for your object is critical. Ensure that your object is located on the build platform and that you are using the best orientation for building.

7.Support and Service

Apollo3D team is on standby and ready to help you with any challenges you may have with your Saturn. If the issues or questions are not covered in this User Guide, you can seek for solutions on our official website or contact us via e-mail.

There are solutions and instructions to common issues that can be found in our knowledge base. Have a look first as most basic questions are answered there. https://www.apollo3dprinting.com

The Apollo3D support team can be reached by e-mail between the working hours of 9:00 a.m. to 5:00 p.m. PST Monday through Saturday. In case you contact us during off-duty time, your inquiry will be answered the following business day.

Note: Because of changing different filament the extruder maybe blockaded. It's not owing to quality issue, and outside the scope of 400 hours life. If users encounter this problem, please contact our after-sale department and finish clean work according to their instruction.

E-mail: service@apollo3dprinting.com

Note: Please provide serial number at the back of the printer before contacting After-sales service.