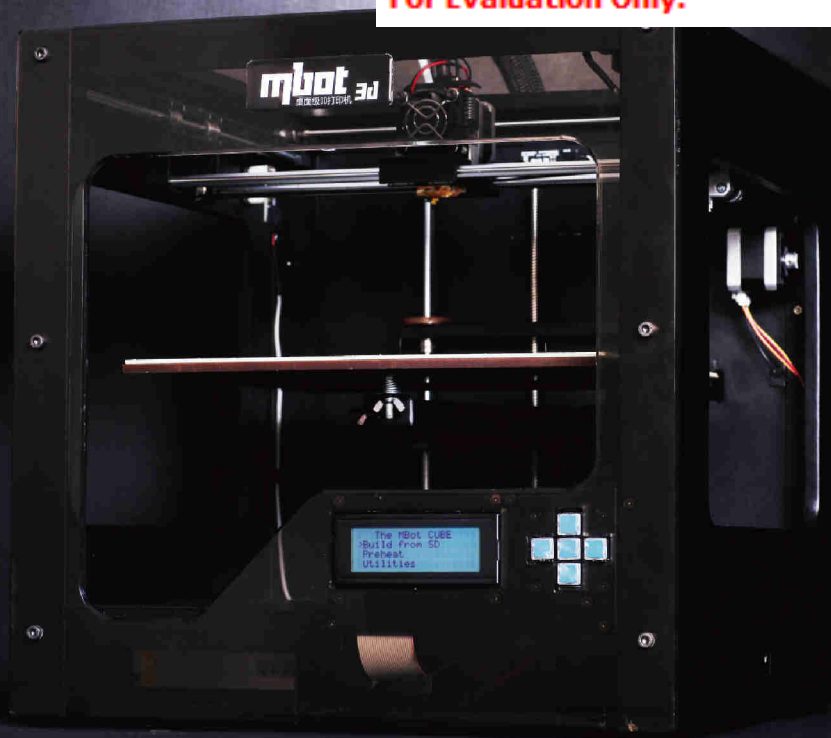


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**mbot** 3d  
Desktop 3D Printer

CUBEII桌面级3D打印机使用手册  
MBot Cubell User Manual

Edited by Foxit PDF Editor

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For Evaluation Only.

**mbot** 3D  
Desktop 3D Printer



Magicfirm公司成立于2009年，致力于成为国内最领先的3D打印服务商，为企业提供一体化综合解决方案，快速、精确、真实的将设计转变成实物，我们坚信，完美的图纸，都不如实物直观。Magicfirm坚信，快速的设计带来更大利润，3D打印，为设计加速。

Magicfirm基于开源3D打印机研发制造出的MBot个人3D打印机系列，目标是普及经济型桌面级打印机，方便设计师、工程师、科技人员甚至是普通爱好者的使用。

Magicfirm是美国3DSystems公司ProJet产品系列、Cube/CubeX系列的中国地区授权代理商，同时还是美国NextEngine公司3D扫描仪大中华地区独家合作伙伴。

Magicfirm, which was founded in 2009, is committed to being the leading 3D printing service provider in China, providing integrated enterprise solutions, turning designs into accurate physical objects rapidly. We firmly believe that even the perfect drawing isn't as intuitive as a touchable object.

Magicfirm is confident that rapid prototyping equates to increased profits and that 3D printing is the key to rapid prototyping.

Based on open source 3D printer, Magicfirm has developed and manufactured MBot personal 3D printer series. Our goal is to democratize low-cost desktop printers, bringing convenience to designers, engineers, scientists, and even amateurs.

Magicfirm is an authorized dealer of 3D Systems Inc for ProJet printers and Cube / CubeX series, and also the exclusive partner of the U.S.-based NextEngine 3D scanner in Greater China.



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中文版 P04-27

English Version P28-51

**Welcome.**  
**Let' s get started.**

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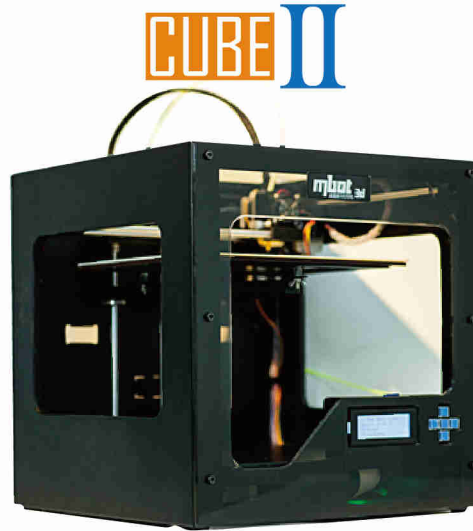
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Thanks for choosing MBot Cube personal 3D printers. To get a better printing experience, we suggest you to take time reading this manual. It will guide you from installing software to operating the machine step by step. Please keep this manual for future reference.

## I.Meet the MBot CubeII

英文版

### ■ Specifications



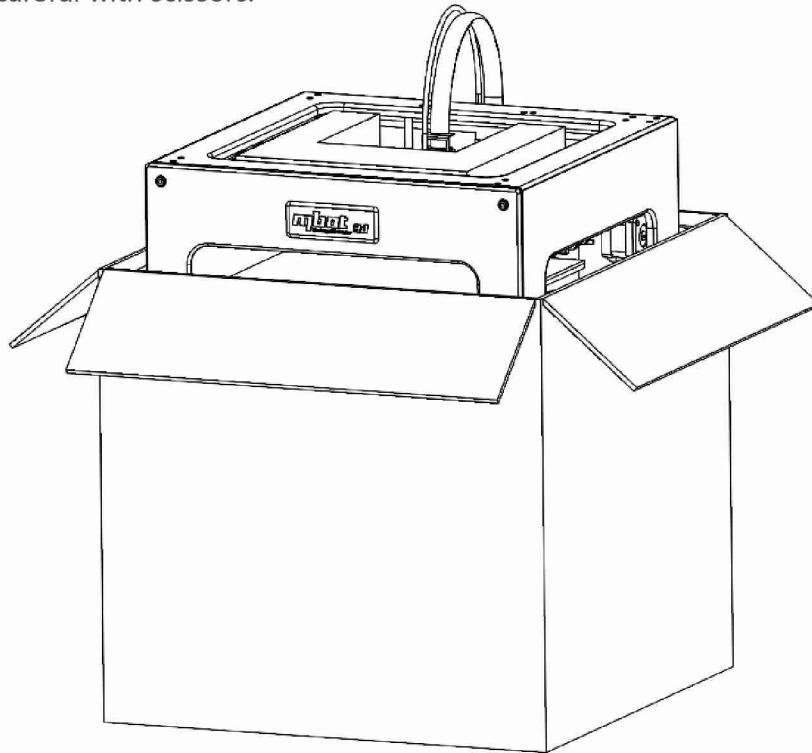
PHYSICAL DIMENSIONS	
Build Volume	260mm×230mm×200mm(x/y/z)
With Spool	405mm×405mm×410mm
Shipping Box	520mm×520mm×520mm
Shipping Weight	18 KG
ELECTRICAL	
AC Input	100-240V, ~2amps,50-60 Hz
Power Requirements	24V DC @ 6.25 amps
Connectivity	USB, SD card [included]
MECHANICAL	
Chassis	Metal steel
Front cover	PVC Panels
XYZ Bearings	IKO linear bearing
Stepper Motors	1.8° step angle with 1/16 micro-stepping
SOFTWARE	
Printer Software	ReplicatorG
File Types	STL
Supports	Windows (XP/7) ; UbuntuLinux (10.04+); Mac OS x (10.6+)

## I.Meet the MBot CubeII

英文版

### ■ Unpacking your printer

1. Place the box on the ground and open it up.
2. Slowly take MBot CubeII out of the box by grasping the upper frame with two hands. Place it on a sturdy table.
3. Gently remove all the fixtures holding parts in place for transport. Be careful with scissors.

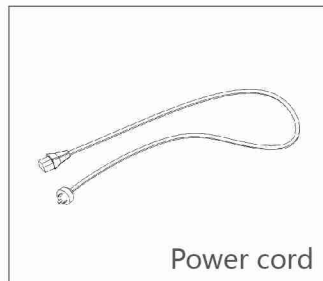
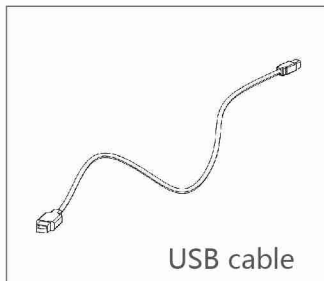
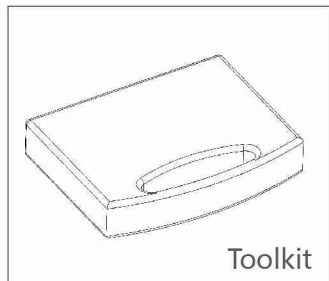
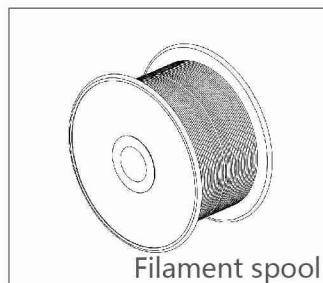
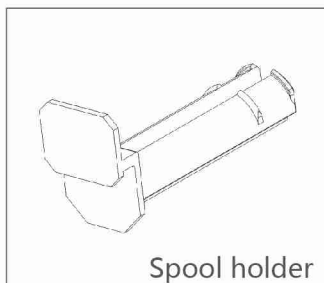
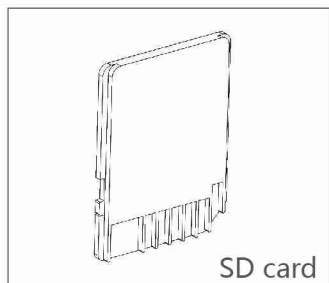


## I.Meet the MBot CubeII

英文版

### ■ What' s included

The box contains the following accessories. If anything is missing or damaged, please contact your sales representative from whom you purchased the printer.

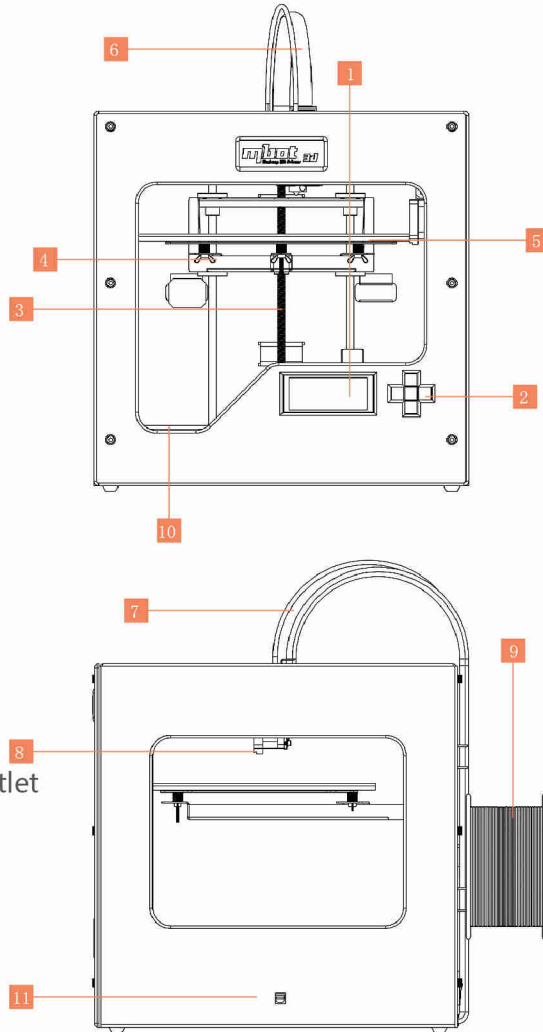


## I.Meet the MBot CubeII

英文版

### ■ At a glance

- [1] LCD panel
- [2] Function buttons
- [3] Threaded Z-axis rod
- [4] Build platform
- [5] Build plate
- [6] Feed tube
- [7] Extruder cable
- [8] Nozzle
- [9] Filament spool
- [10] Salvaged material outlet
- [11] USB port

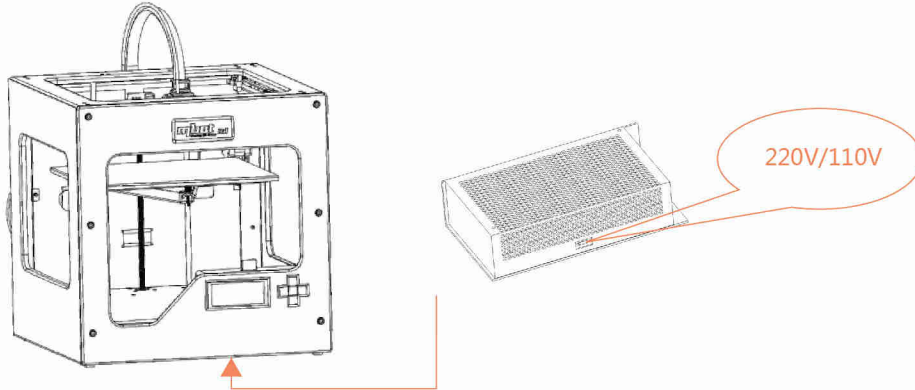


## II. Setting up your MBot Cubell

英文版

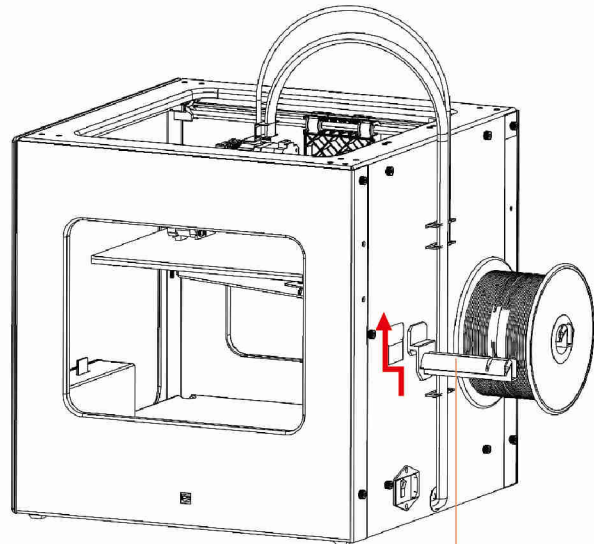
### ■ Power switch

The power supply of MBOT 3D printer could be switched between 220 Volt and 110 volt. It is located on the bottom side and the origin out put is 220 volt.



### ■ Installing spool holder

Tilt the spool holder and insert it into one of the holder mounts on the back of the printer. Then, fit your filament spool onto the installed holder.



Spool holder ■

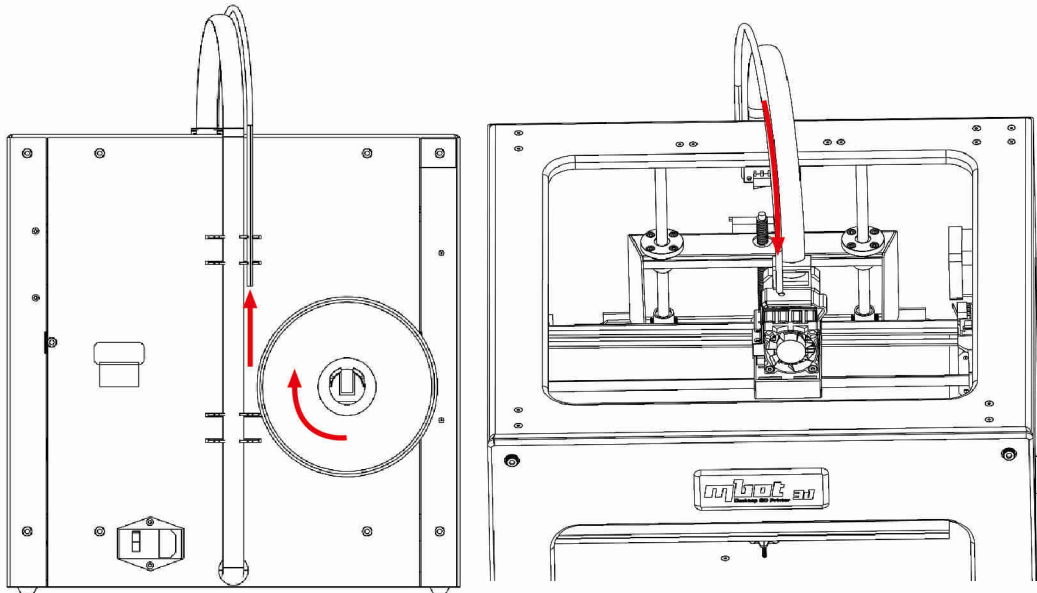
## II. Setting up your MBot CubeII

英文版

### ■ Loading filament

Open the package and take out the filament spool. Fit it onto the right holder on the back of the machine. Make sure the spool spins clockwise (when viewed from the back of the machine) when printing, and that the end of the feed tube isn't lower than the spool holder, as shown below. Then, push filament through the feed tube into the extruder.

(As for CubeII with dual extruders, mount the second spool on the left holder and ensure that it spins counter-clockwise.)





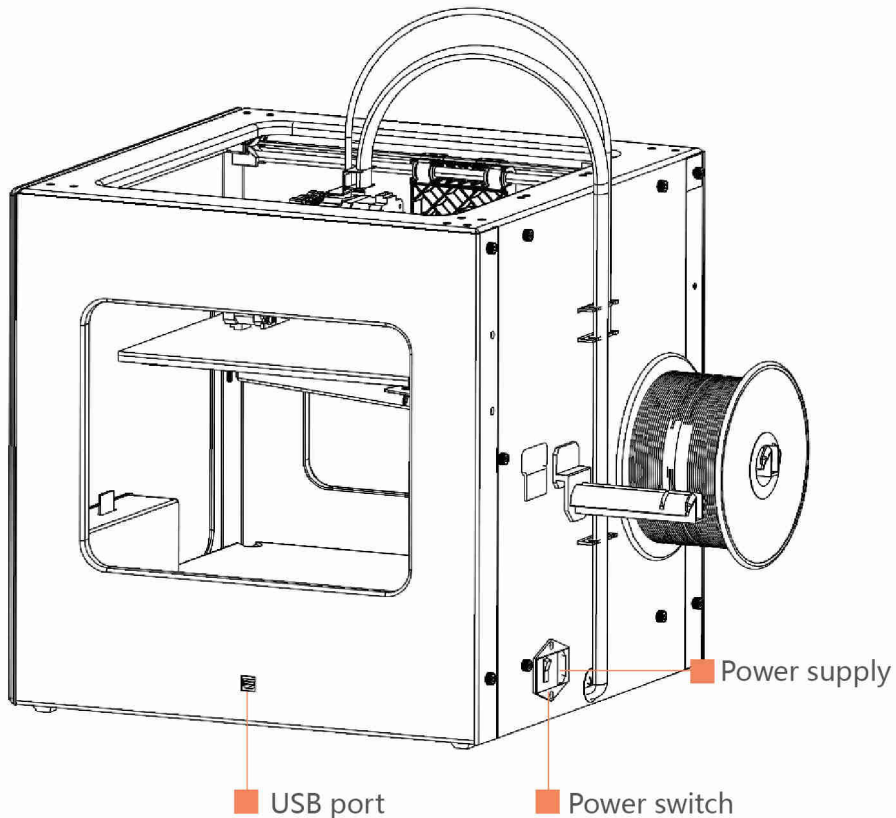
## II.Setting up your MBot Cubell

英文版

### ■ Attaching cables

Insert one end of the USB cable into the port on the right of the machine, and DON' T attach the other end to any device yet.

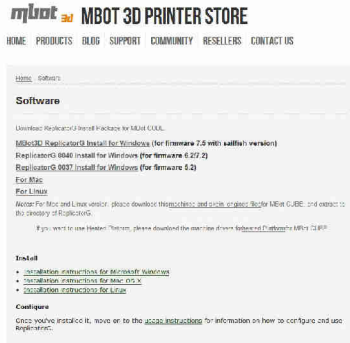
Make sure your printer power switch is in the OFF position and then plug the power cord into the power supply located on the back of the machine and power on.



### III. Installing software

#### ■ Setting up the operating environment

1. Go to <http://www.mbot3d.com/downloads>, <http://www.python.org/download/>, and download ReplicatorG and Python2.7.

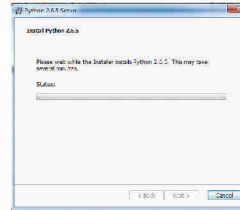
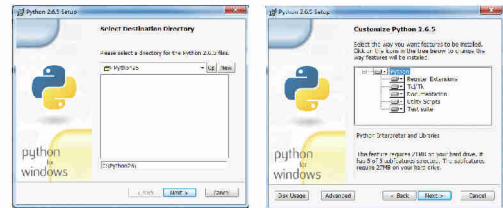


2. After you've downloaded the files, install Python 2.7. For Windows XP, double-click Python2.7 to install. For Windows 7, run the installer with administrator rights. (TIPS: Right click on the installer to get the "Run as Administrator" option.)



3. Keep clicking "Next" button until you get only one "Finish" button to click.

NOTE: Use the default installation directory.



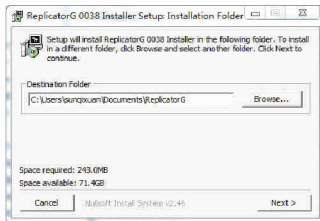
4. Click the "Finish" button to complete the installation.



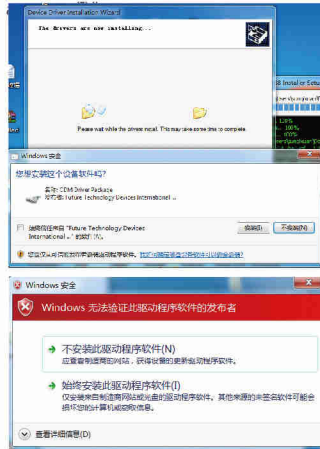
### III. Installing software

#### ■ Installing and setting up printer driver

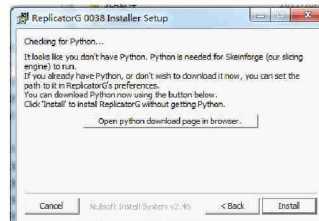
1. Double-click ReplicatorG, and you'll see the following window.



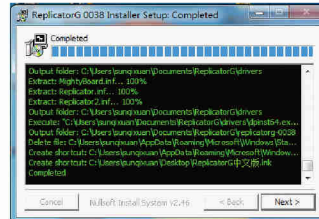
4. Click the "Install" button on the "Windows Security" pop-up to install the printer driver. When another "Windows Security" pop-up appears, click on "Install this driver software



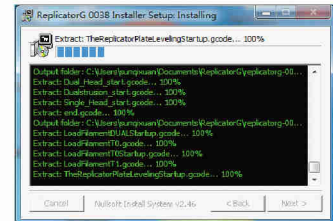
2. Click the "Next" button. Then on the following window, click the "Install" button. Suggest using the default destination folder.



5. Click the "Finish" button to complete driver installation. Finally, on the "ReplicatorG Installer" window, click the "Next" button to finish the installation of ReplicatorG.



3. You'll see the installer working as shown below. Once done, the Device Driver Installation Wizard pops up. Click the "Next" button to install the driver for ReplicatorG.



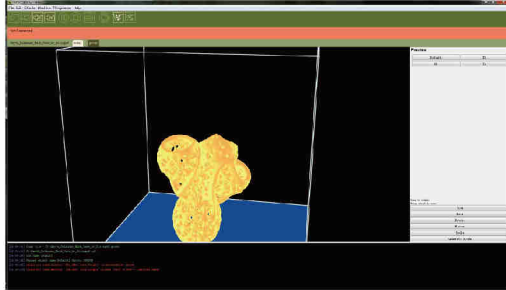
6. A short-cut icon of ReplicatorG is created on the desktop of your computer.



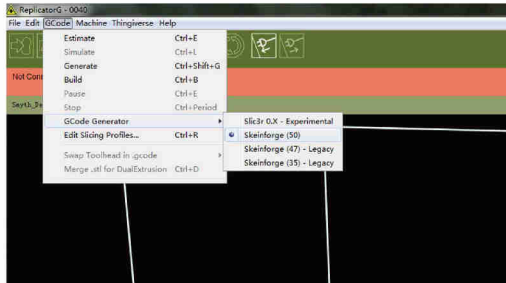
### III. Installing software

#### ■ Configuring 3D printing software

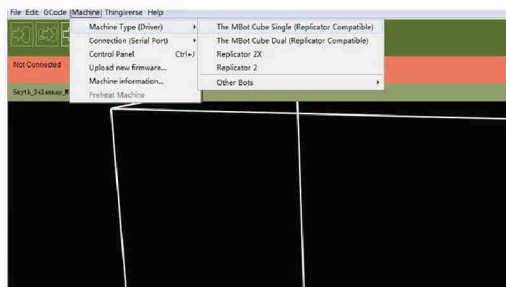
1. Run ReplicatorG.
2. Choose extruder and connection serial port.



- a. Click GCode->GCode Generator, and select "Skeinforge(50)" .

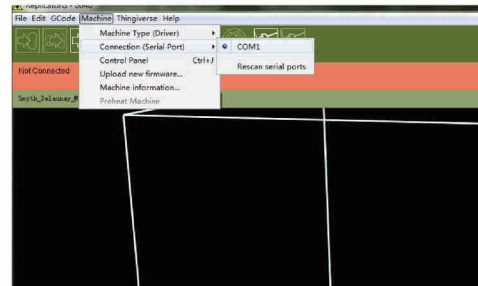


- b. Click Machine->Machine Type (Driver). If your printer is dual-extruder, select "The MBot Cube Dual" . If it's a single-extruder machine, select "The MBot Cube Single" .



- c. Select Machine->Connection (Serial Port) ->COM09. If you have only one printer, select the latest port. If you have more than one printer, please select the port according to your printer.

If there's no serial port on the menu, please click Machine->Connection (Serial Port) ->Rescan serial ports. If it doesn't work, please close ReplicatorG, disconnect the USB cable from your computer, and wait for 5 seconds. Then connect the USB cable to the computer, run ReplicatorG, and click Machine->Connection (Serial Port) ->Rescan serial ports. Wait for 10 seconds, and you'll be able to select serial port.



- d. Make sure you've selected the corresponding serial port. Click the Connect icon (as shown below) at the right of the top bar. Once connected, GCode generator and connection serial port can't be changed. If you want to change, please click Disconnect icon (at the right side of the following icon).



- e. When the machine is connected successfully, the status bar below toolbar turns green. Otherwise, red. When the machine is running normally, it turns yellow.



#### NOTE:

When the machine can't be connected, please check:

Power is being supplied to the printer.

Your computer is connected to your MBot with the supplied USB cable.

Driver is installed successfully.



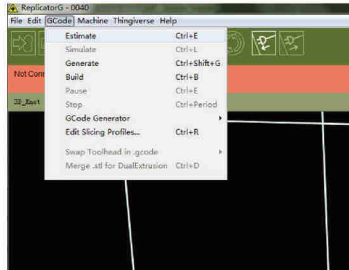


### III. Installing software

英文版

#### ■ Setting up 3D data

3. To estimate time for printing, click GCode-> Time Estimate (as shown below).



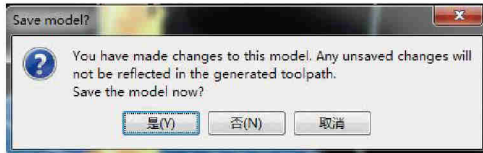
After about 30 seconds, the estimation is displayed at the bottom of the window (as shown below). It may take 3 hours and 15 minutes to build our sample. Usually, it takes longer than estimated.



4. Generating GCode(Slicing)

a. Click the "Generate GCode" button at the lower right corner of the window. Then the following prompt pops up, if the model is adjusted but not saved. Click "Yes" to save changes. Otherwise, click "No". Suggest clicking "Yes" to generate GCode.

b. After clicking "Generate GCode", the following window pops up. Red arrows point to our tips.



**Select MBot Cube**  
 Recommend checking it. Rafts are automatically generated under the bottom of the models.

**Check these options.**

Fill Density: 0%, only a shell, empty inside; 1%-99%, hexagonal structure; 100%, solid.  
 Test printing cubes to observe differences. As the fill density decreases, less material is used. Set according to your requirements.

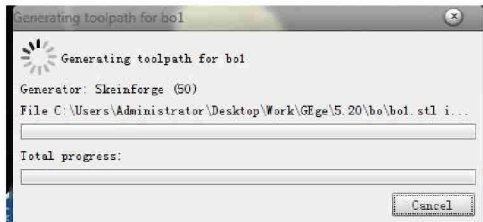
If you're following our example, please select "Outside" support, as our sample model has no material beneath to support it on the right.  
 If the model has overhanging features inside, please select "Full" support.

Any value between 0.1 and 0.3. Suggest inputting 0.15. The smaller value you input, the better quality you get.

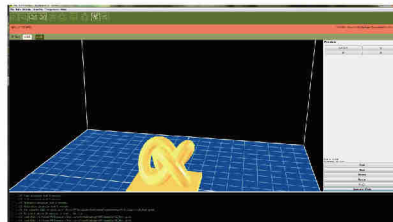
Suggest inputting 25. The smaller, the better, but it takes more time to build.

**Input 230.**

c. When finishing setting up, click the "Generate GCode" button and you'll see the window showing progress as below.



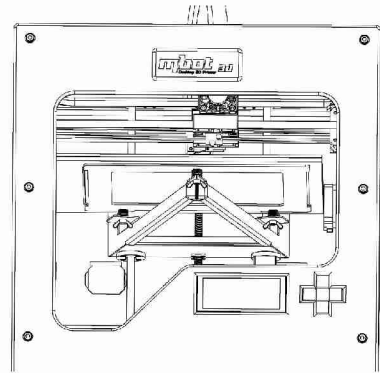
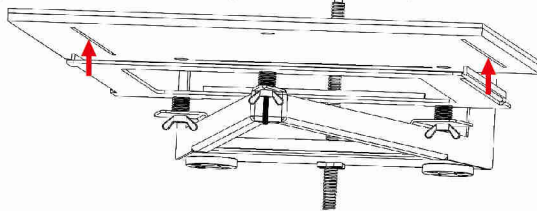
d. After GCode is generated, you'll see the "gcode" tab next to the "model" tab as shown.



## IV. Pre-print checks

### ■ Leveling the build platform

Raise the build platform to its maximum height. Stop when reaching the limit. Turn the butterfly screws beneath the build platform to ensure 1mm gap between the nozzle and the build plate. Print a raft to check. If there's very thin space between every two adjacent lines of the raft, you've leveled the build platform successfully.



### ■ Turn on the printer

Turn on the printer power switch. The LCD panel will show the firmware version. Then, it displays an extruder temperature error. That's because the machine makes temperature test automatically and supposes there's no temperature when turning on, while in fact the extruder is at room temperature. Press the center key beside the LCD panel to disarm the alarm. Now, plug the other end of the USB cable to your computer.

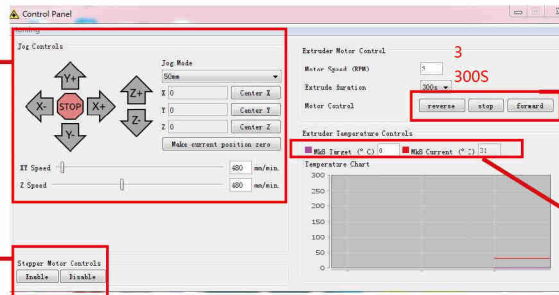
### ■ Test printing

Please test nozzles before your first printing, which is required for first printing only.

1. Click  to open the Control Panel as shown.

Use default settings.

When testing, make sure the nozzle is away from the blue build platform and rotate the Z-axis manually. If the Z-axis doesn't work, please click the "Stop" button (i.e. the right one).



Press these buttons only when the temperature reaches 220°C.

Click "Forward", then the motor runs forward. The filament moves downward, and plastic will start to come out of the nozzle.

Click "Backward", then the motor runs backward. The filament moves upward to exit from the extruder. Gently pull the filament from the feed tube.

Input "220" and then press "Enter" key on your keyboard. The number beside (in gray font) shows current temperature which will rise to 220°C.

2. Once the nozzle reaches desired temperature (PLA: 195-220°C; ABS: 230-260°C; Suggest 210°C for PLA and 240°C for ABS), load filament as shown below. Thread filament through feed tube, and insert it into the hole in the top of the extruder, pushing until it touches the bottom of the hole. Click "Forward" button, and then take the filament and push firmly. Maintain pressure on the filament. After a few seconds, you should begin to feel the motor pulling it in. Then let go. You'll see some plastic start to come out of the nozzle.

During the process (or when changing material), you may hear the noise like "tah-tah-tah". Please maintain pressure on the filament for 25 seconds. Then the noise will disappear.





## V.Printing

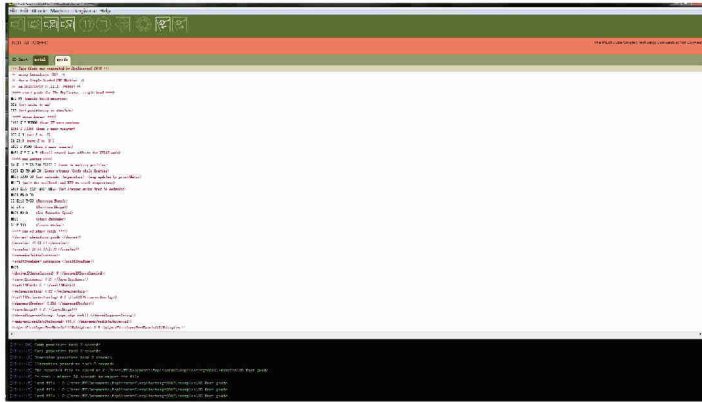
英文版

### ■ Printing from computer

1. Click “Print” icon (as shown) at the top left corner of the window.



2. The window shows as below and the printer starts running. It may stay at one position for a while to heat up. When the nozzle is at desired temperature (displayed at the top right corner of the window), plastic will start to be extruded out of the nozzle.

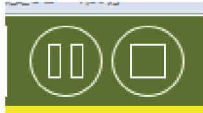


3. If you want to pause or stop building, click the icons as shown below.

NOTE:

In the initial phase of 3D printing (when the status bar below toolbar is yellow), the Pause and Stop icons are disable. You can close ReplicatorG to pause building.

While building, it may take seconds to pause after clicking Pause. Sometimes it may take about 30 seconds which depends on your computer configuration. DON' T hit Pause again when waiting.



4. When finishing building, you' ll see the icon below. Take the model out by hands or shovel.

NOTE: Before powering off the printer, click the “Disconnect” icon (as shown below).



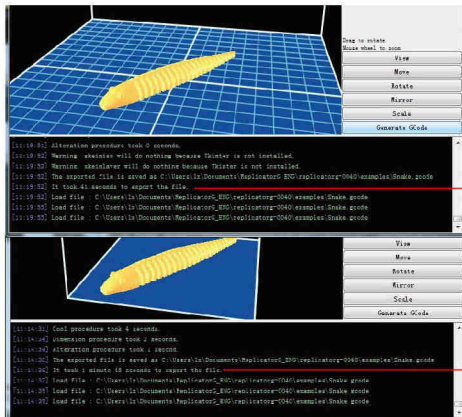
## VI.PyPy Acceleration

英文版

In the newest version of ReplicatorG, PyPy is introduced to GCode generation. When converting a model with the same settings, PyPy is 2-3 times faster than traditional Python. These two kinds of interpreters have their own advantages. Python has more stable performance, while PyPy has superior processing speed. The following paragraphs will show you how to set up PyPy acceleration. Use it or not according to your needs.

### PyPy vs Python Processing Speed

	Model(Snake)	Whistle	3D_Knot
Python	1min 29sec	1min 30sec	2min 37sec
PyPy	41sec	45sec 1min	10sec



It took 41sec with PyPy.

It took 1min 45sec with Python.

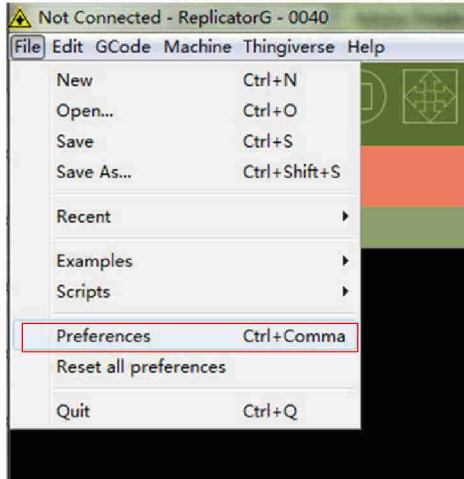
1.打开<http://pypy.org/download.html>在下图中，如果是Windows系统用户，选择红色框位置下载PyPy。

- [Linux x86 binary \(32bit, tar.bz2 built on Ubuntu 10.04.4 LTS\)](#) (see [1] below)
- [Linux x86 binary \(64bit, tar.bz2 built on Ubuntu 12.04.2 LTS\)](#) (see [1] below)
- [ARM Hardfloat Linux binary \(ARMHF/gnueabihf, tar.bz2, Raspbian\)](#) (see [1] below)
- [ARM Hardfloat Linux binary \(ARMHF/gnueabihf, tar.bz2, Ubuntu Raring\)](#) (see [1] below)
- [ARM Softfloat Linux binary \(ARMEEL/gnueabi, tar.bz2, Ubuntu Precise\)](#) (see [1] below)
- [Mac OS/X binary \(64bit\)](#)
- [Windows binary \(32bit\)](#) (you might need the [VS 2008 runtime library installer vcredist\\_x86.exe](#))
- [Source \(tar.bz2\)](#)
- [Source \(zip\)](#)
- [All our downloads](#), including previous versions. We also have a [mirror](#), but please use only if you have troubles accessing the links above

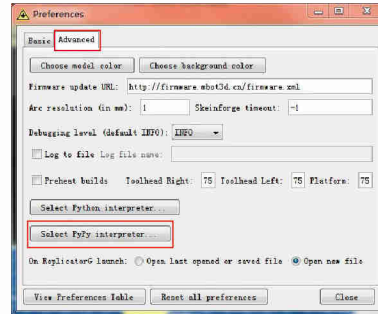
## VI.PyPy Acceleration

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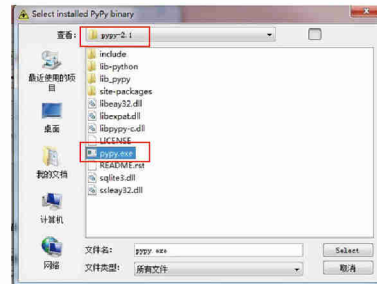
2. After downloaded, unzip PyPy to the root folder of the C drive. Start ReplicatorG and select "File -> Preferences" .



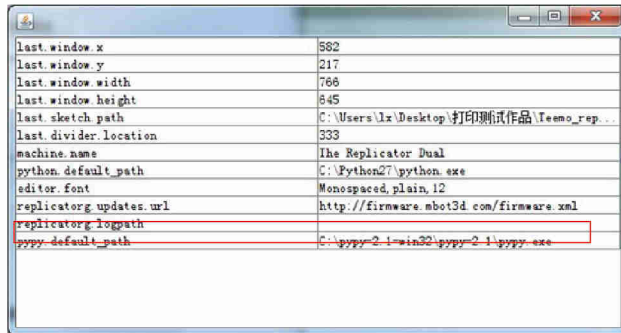
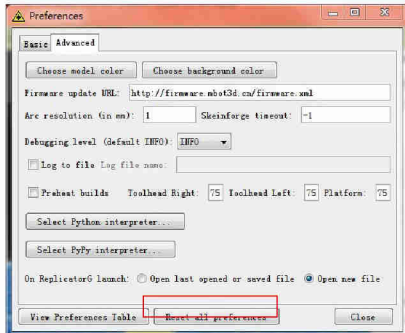
3. On the pop-up window, click "Select PyPy interpreter..." button under the "Advanced" tab.



4. Find the installation directory and select "pypy.exe" . Then, click "Select" button.

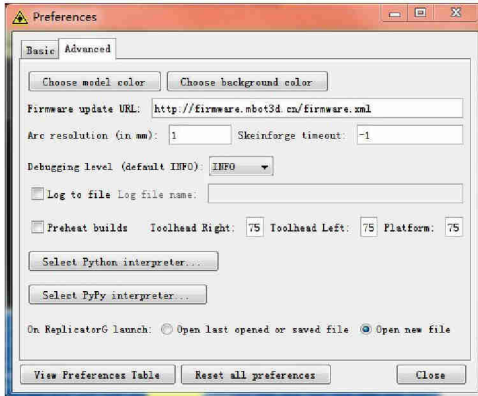


5. NOTE: Click "View Preferences Table" to check what interpreter is set to and if the path is right.

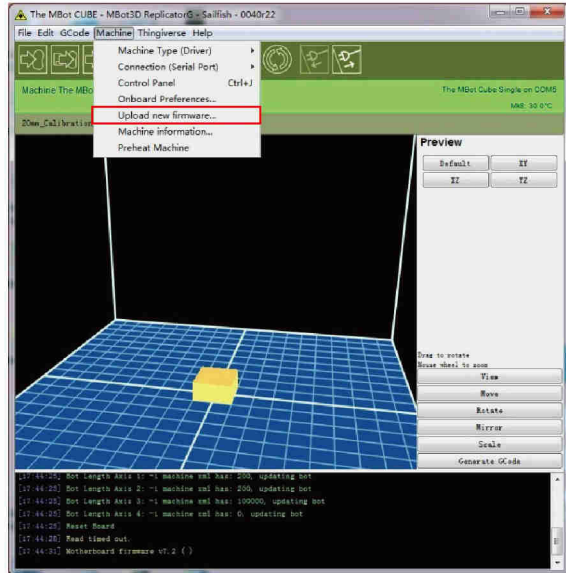


## VII.Updating firmware

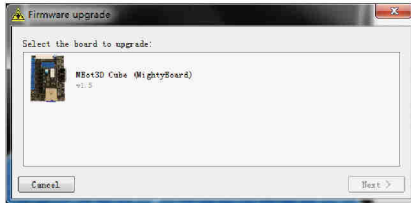
1. Before updating firmware, please open ReplicatorG and select File-> Preferences -> Advanced to check "Firmware Update URL" (<http://firmware.mbot3d.cn/firmware.xml>). Otherwise, please input this URL.



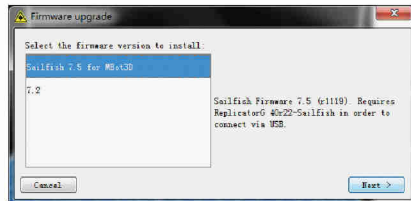
2. Connect the printer to your computer with USB cable. Go into ReplicatorG's Machine menu, and choose "Upload new firmware".



3. Select the board you're upgrading as shown below and click "Next".



4. Choose the newest version of the firmware and click "Next".



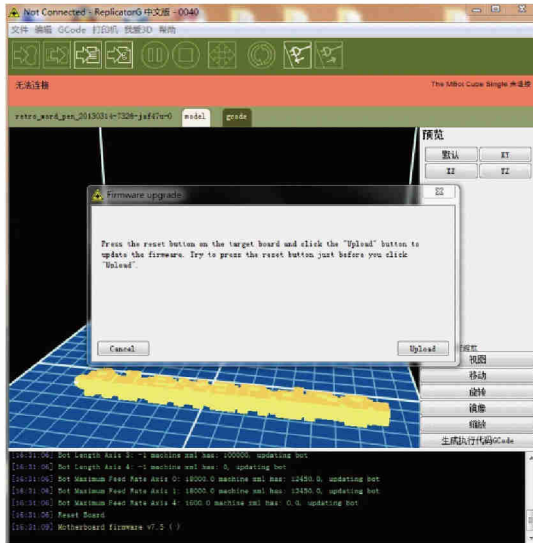
5. Select the serial port connected to your computer and click "Next".



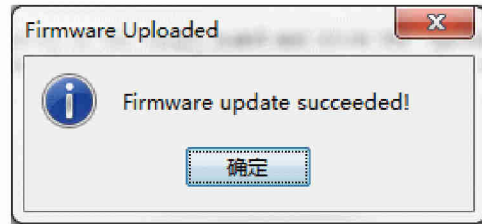
## VII.Updating firmware

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6. Now, the prompt pops up as shown below, guiding you to disconnect with the printer.



7. Hit the Upload button, wait a fraction of a second, press the reset button on the printer (which is next to the USB port). During upgrading, the LED light on the board keeps blinking. It will take about one minute to complete. When updated successfully, you should see the message shown below.



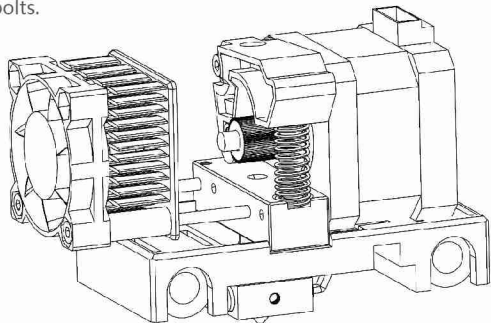
8. If update failed, the message displays as below. It may be because you waited a little longer between hitting the upload button and pressing the reset switch. Please click "OK" and try step 7 again.



## VIII.Maintenance and Troubleshooting

### Cleaning extruder

After working for months, small pieces of hardened plastic can stick to the drive gear, which is the part of the extruder that pushes filament through the extruder. To ensure smooth operation of the machine, it needs cleaning regularly. To clean it, unscrew the two bolts at the lower corners of the fan. Pull out the motor assembly behind the fan and use a knife to remove all the pieces of filament stuck to the drive gear. Then, reseal the motor assembly and screw the two bolts.



### Calibrating your printer

If the object isn't consistent to the design, please select "Home axe" on the LCD panel. X, Y and Z axes will automatically reach the travel limit switches. Now, open ReplicatorG and go into "Control Panel". Click X + / X - to move X-axis to 130(for CubeII), or 100 (for Cube and Cube PVC). Click Y + / Y - to move Y-axis to 60. Then click File -> Scripts -> Calibration -> MBot Calibration ->OK -> OK. The extruder will move to the back right of the machine and the build plate rises to the maximum height. A message will appear asking if you wish to save your settings, click OK. The calibration is done.

### Cleaning the build platform

The build platform can be removed from CubeII. Take out the build platform with the object (if it isn't large). When the nozzle is too close to the build platform, it's hard to release the object from the build platform. Use a shovel to pry the corners of the object and then you'll be able to peel it away. After cleaning, reseal and level the build platform.

### Can't connect the printer to the computer

Please check if the software version is compatible with your printer. Select the correct type on the "Machine->Machine Type (Driver)" menu. "The MBot Cube Single" for single-extruder machines and "The MBot Cube Dual" for dual-extruder machines. Then, rescan the connection serial port. If it still doesn't work, please contact us for technical support.

### Abnormal noise on X and Y axes

Exchange the wires of X-axis motor and Y-axis motor on the board. Open ReplicatorG and go to the Control Panel to move X and Y axes. Reseat the wires of X and Y axes and check if the problem is fixed. If there's still abnormal noise, please contact us for technical support.

### Warping when building

Observe the warping position of the object, and adjust the screws beneath the build plate. Raise the side of the build plate right below the warping. Suggest printing in a confined space, reducing air flow. Moreover, check whether the distances between the four corners of the build plate and the nozzle are equal. Follow "The first layer doesn't stick to the build plate" section to adjust.

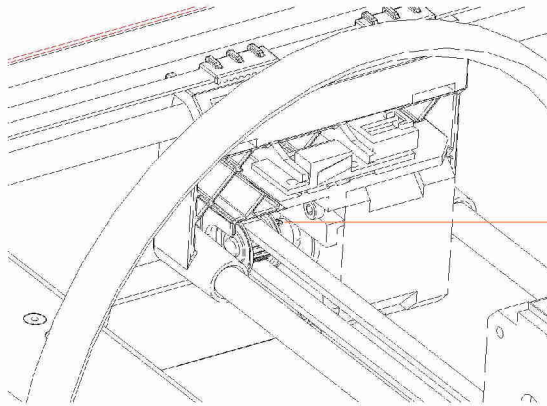


## VIII.Maintenance and Troubleshooting

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### Fixing the loose X-axis belt

After running for months, the X-axis belt may become loose, which might result in slippage and get a few mm offset in X-axis. Tighten the belt to ensure the machine run normally. Do as follows: loosen four black screws on X-axis motor with the hex wrench as shown below, and then pull the X-axis motor hard towards right while tightening the four screws. Now, gently press the top belt down to the bottom belt. After letting go, the top and bottom belts separate immediately, meaning the belt has been tightened.



If X-axis belt is loose, please tighten the screw.

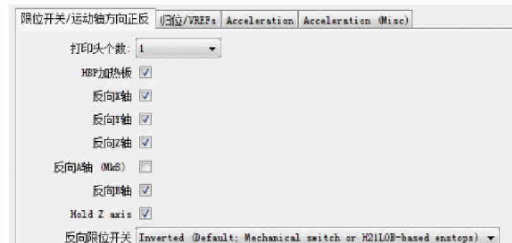


### The first layer doesn't stick to the build plate

Raise the build platform to the maximum height, and adjust the butterfly screws beneath. The ideal distance between the nozzle and the build platform is 0.5mm-1mm (i.e. the thickness of two sheets of A4 70g paper). You can fold a piece of A4 70g paper in half as reference. Adjust the screws until you can pass the folded paper between the plate and the nozzle. You should feel some friction on the paper but still be able to easily pass it between the plate and the nozzle without tearing or damaging the paper. During the process, you can use "Level build plate" command on the printer menu to help adjusting.

### X-axis moves backwards when building

Connect your printer to the computer. Open ReplicatorG and select "Machine -> Machine Preferences" on the toolbar. Uncheck "Invert X-axis". If it can't be fixed, please contact us for technical support.



## VIII. Maintenance and Troubleshooting

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### The resolution is low

Open ReplicatorG and adjust the parameters on Generate GCode window. Set 0.18 - 0.2 for high resolution and 0.27 for default. If it can't be fixed, please contact us for technical support.

### No plastic coming out of the nozzle

If there's no plastic coming out of the nozzle, please try the following:

Check if the filament is inserted into the feed tube correctly.

Set the extruder temperature to 235-240 °C (ABS) or 190-230 °C (PLA).

Take apart the extruder and enlarge the distance between the feed gear and the bearing. If they are too close, the filament will be blocked.

If the extruder fails to extrude at the very beginning of building, please keep pushing for 25 seconds and check.

Recommend printing from SD card, because in this way the data will be transferred into a structure (XTL format), while printing from computer may result in data error.

### Unblocking the nozzle

If there's no plastic coming out of the nozzle, while the fan and the drive gear are working, the nozzle may be blocked.

Unscrew the bolts at the lower corners of the fan. When heating the extruder, thread the straightened paper clip through the feed hole into the extruder nozzle. Push gently until feeling resistance. Then reload the filament and check extruding.

NOTE: The nozzle becomes extremely hot during set-up and operation. DO NOT TOUCH THE NOZZLE.

### The object gets a few mm offset

There are three possible causes:

X or Y axis belt is loose.

If X-axis belt is loose, loosen the X-axis motor screws, and then pull the X-axis motor assembly hard towards right while tightening the screws.

If Y-axis short belt is loose, loosen the Y-axis motor screws, and then pull the motor assembly hard downward while tightening the screws.

If Y-axis long belts are loose, loosen the synchronous wheel bolts on the rod located in front left side of the machine. Then tighten the long belts on both sides. (NOTE: the numbers of teeth on both synchronous wheel gears should be consistent). Finally tighten the synchronous wheel bolts on the rod located in front left side of the machine.

X-axis is inclined.

Hold the right plastic part of X-axis by your right hand, and the left one by your left hand. Straighten the X-axis according to the incline. You can use the upper frame as reference.

Synchronous wheel bolt is loose.

Tighten synchronous wheel bolt on the rod. NOTE: Ensure to aim the hole of the synchronous wheel bolt on the motor assembly at the surface of the motor shaft, so that the bolt can be tightened.



## VIII.Maintenance and Troubleshooting

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### TIPS

1. Recommended ambient operation temperature: 25°C - 30°C.
- 2, Keep the machine away from any liquid. Or, it may get damaged.
- 3, The nozzle temperature is over 200°C when the printer is operating. Avoid touching.
- 4, ABS will produce a strong smell when building, so please keep ventilated.



## 联系我们 CONTACT US

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再次感谢您选择使用MBot个人3D打印机产品！

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