mbot 3d

Desktop 3D Printer

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

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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Welcome.
Let’ s get started.

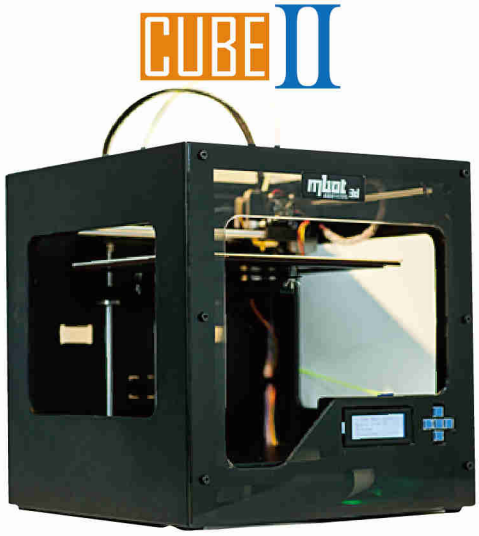
目录

感谢您购买Mbot CUBE个人3D打印机，为了带给你良好的使用体验，请务必仔细阅读本手册。它将从软件的安装到设备的正常使用，逐一为您做出详细的说明。请妥善保存本手册以供今后参考。

I.欢迎使用

Chinese version

■ 基本参数



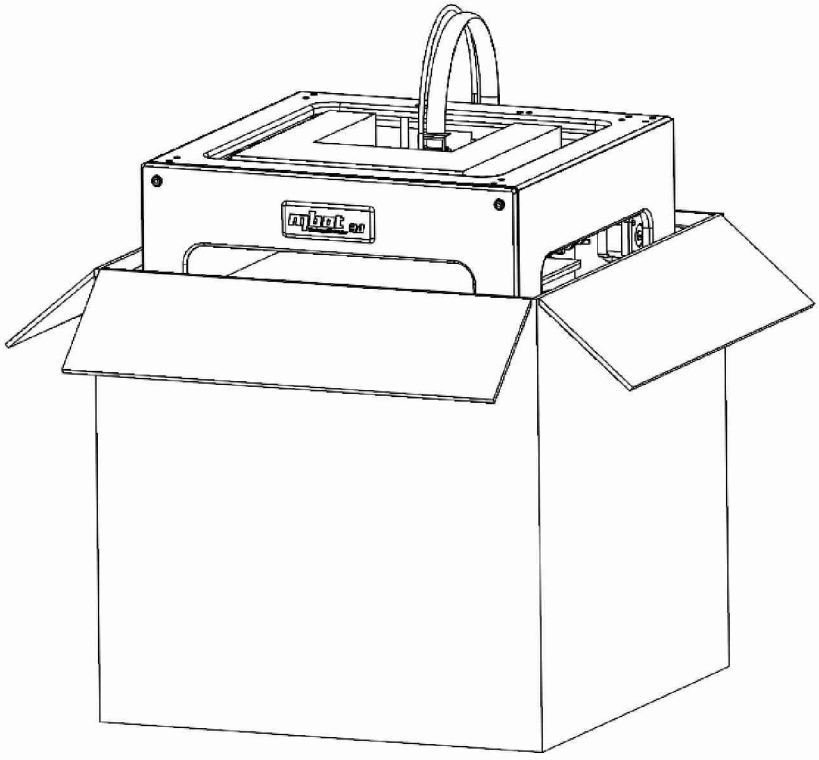
外形尺寸	
构建尺寸	260mmx230mmx200mm(x/y/z)
主机尺寸	405mm x 405mm x 410mm
运输尺寸	520mm x 520mm x520mm
运输重量	18 KG
电路	
AC电源	100—240V, ~2 amps,50—60 Hz
电源要求	24V DC @ 6.25 amps
数据输入	USB, SDcard [included]
机械特性	
外壳	钣金
控制面板	PVC面板
XYZ轴轴承	IKO直线轴承
步进电机	每步1.8°，线距离1/16微米
软件	
ReplicatorG	中文版
打印文件格式	STL
操作系统支持	Windows (XP/7) ; Ubuntu Linux (10.04+); Mac OS X (10.6+)

I.欢迎使用

Chinese version

开箱

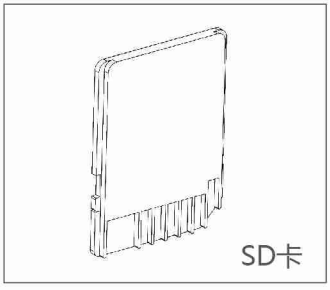
1、将包装箱置于水平地面上，向上开启。
2、双手抓住机身顶端，慢慢将机器抬出包装箱，安放于稳定的工作台面上。
3、轻轻去除全部机身部件固定物，请小心使用剪刀。

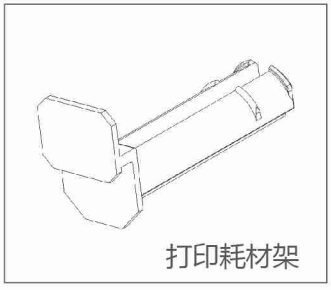


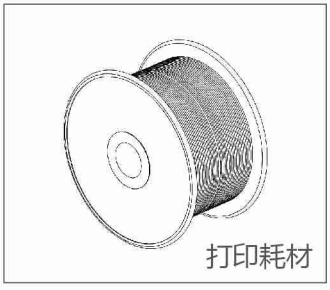
I.欢迎使用

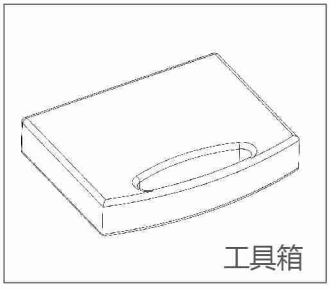
■ 包装箱内物品

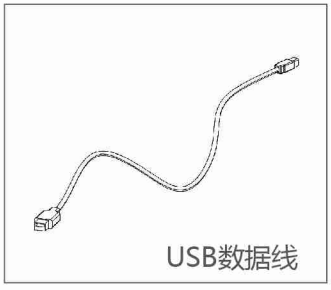
下列物品随本产品包装附带，若发现有缺少或受损，请与您购买本产品的业务代表联络。

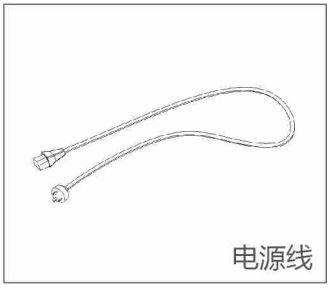

SD卡


打印耗材架


打印耗材


工具箱


USB数据线


电源线

I.欢迎使用

Chinese version

结构图解

[1]液晶显示屏

[2]操作按键

[3] Z轴螺纹轴杆

[4]打印托盘

[5]打印平台

[6]进料导管

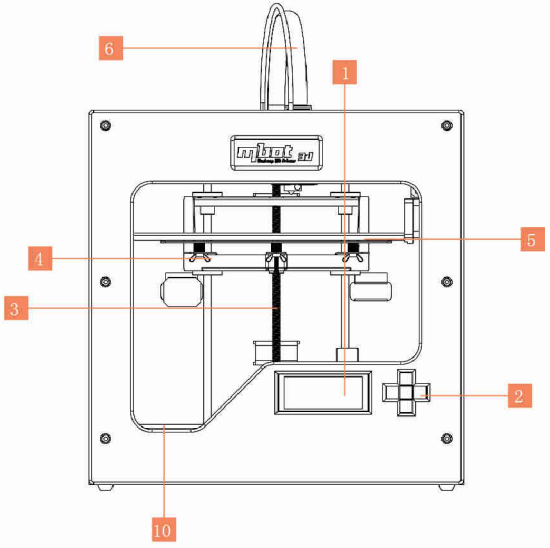
[7]打印头电缆

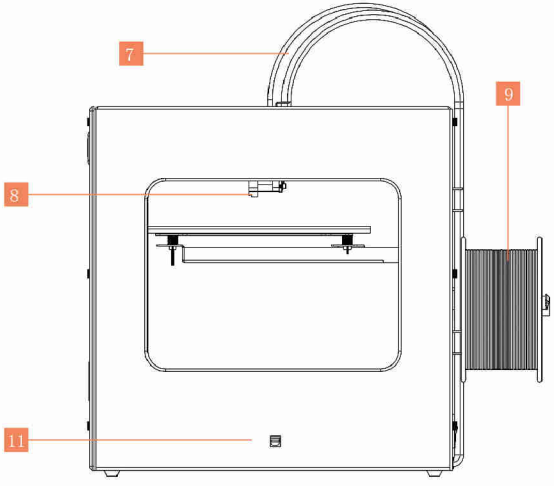
[8]打印头

[9]打印耗材

[10] 废料出口

[11]数据线接口



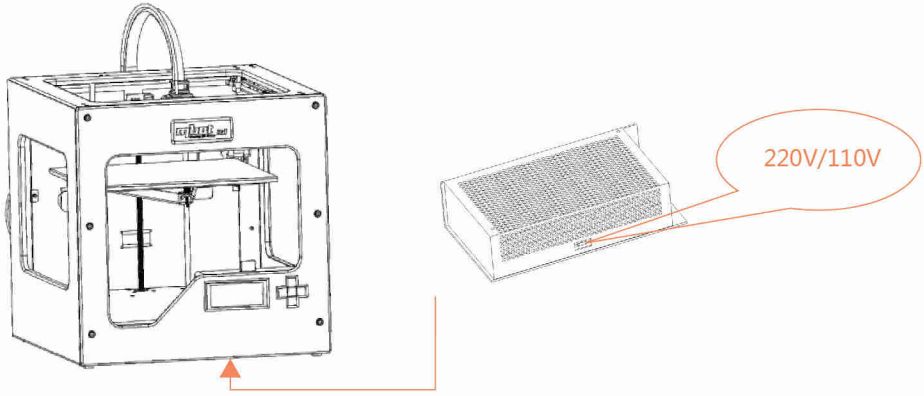


II.开始使用你的MBot Cube II桌面级3D打印机

Chinese version

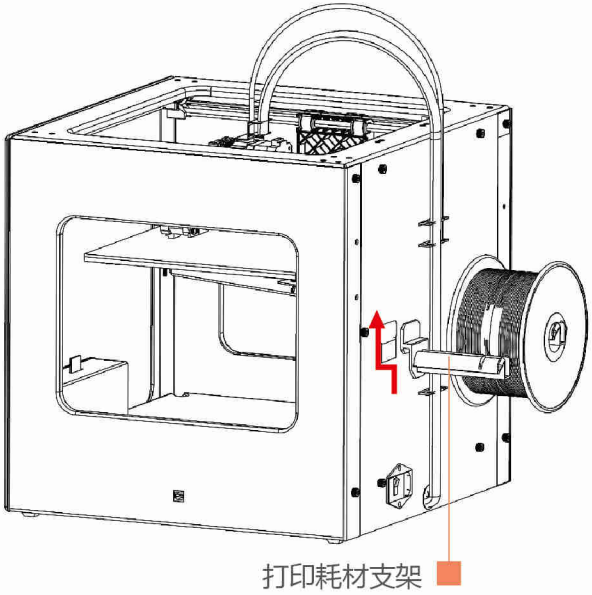
■ 电源的切换

Mbot 3D打印机的电源可根据您所在地区家庭用电电压在220V或110V之间进行切换，切换开关位置在机器底部图示位置，出厂前默认设置为220V。



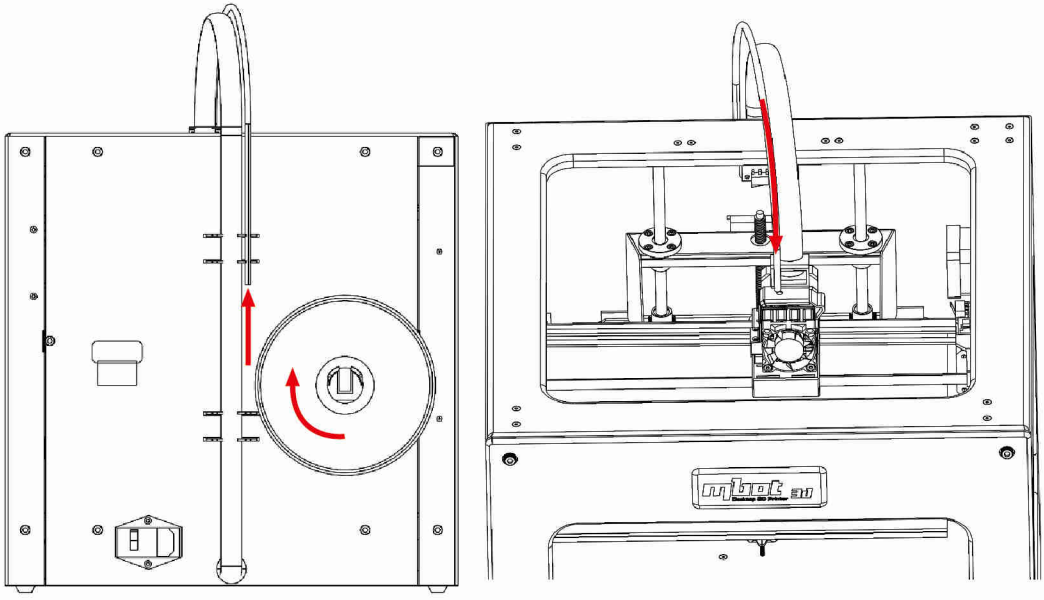
■ 打印耗材固定架安装

将打印耗材固定架倾斜插入，机身背面的打印耗材固定架挂孔的任意一孔内，再将耗材套入打印耗材固定架上。



打印耗材安装

打开包打印耗材外包装，将打印耗材安装到机器背面的打印耗材固定架上，确保机器工作时耗材（从机器背面查看时）顺时针旋转，并确保机身背面导管端口位置不要低于打印耗材固定架，如图所示（双头机型请于左侧对称安装打印耗材，并确保其逆时针旋转），将通过导料管的耗材插入打印头内。

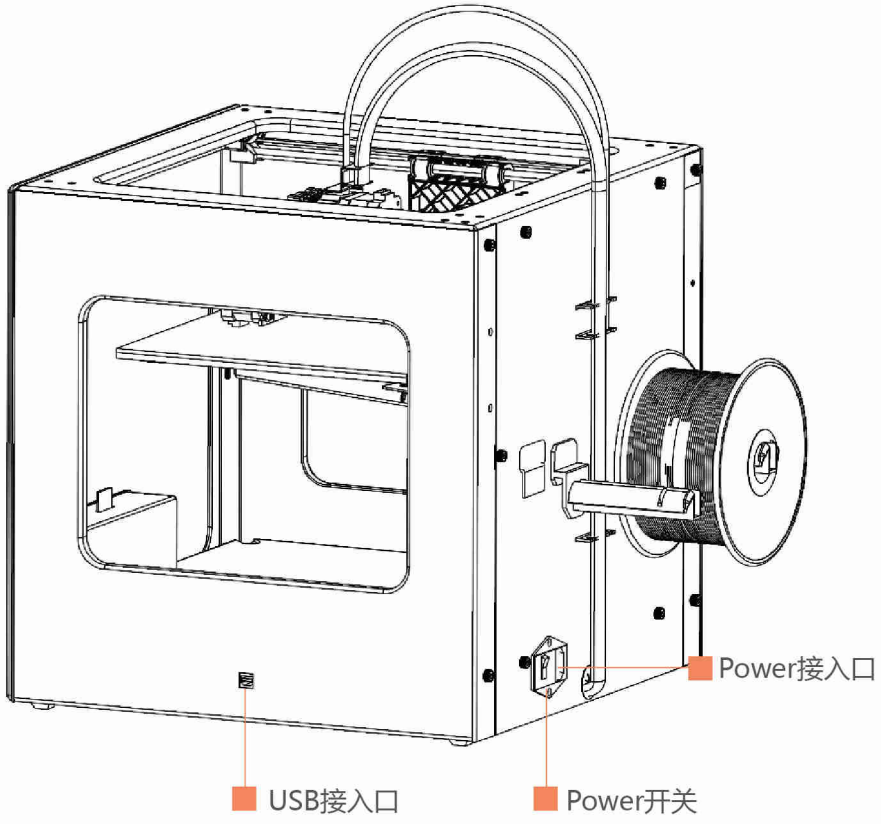


II.开始使用你的MBot Cube II桌面级3D打印机

Chinese version

■ 打印机的连接

将USB数据连接线插入到机器右侧的插口中，数据连接线另一端暂时不要做任何连接。确保在机器电源开关处在关闭状态，将电源线插入机身背面的插孔并连接电源。



III. 软件的安装

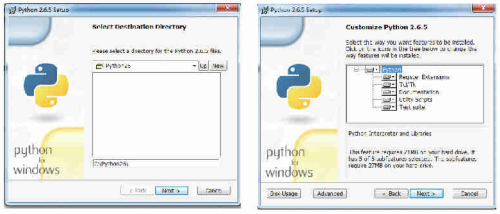
Chinese version

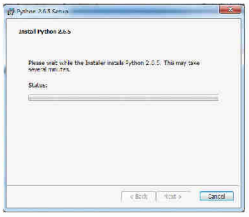
■ 运行环境安装

1.打开http://www.mbot3d.cn/downloads，在下图中的两个红色框位置点击下载Replicatorg中文版和Python2.7。

2.下载完成后，打开Python2.7，XP系统的用户双击Python2.7进行安装，WIN7系统的用户以管理员的身份进行安装（选中后，通过鼠标右击选择“管理员取得所有权”即可获得）。

3.直接点击“Next”，之后的几个步骤都点击“Next”。注：安装的整个过程，使用默认路径。





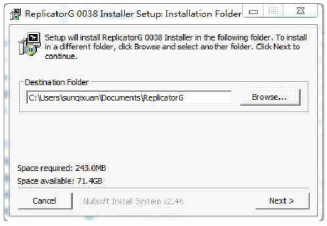
4.最后，点击Finsh完成安装。

III. 软件的安装

Chinese version

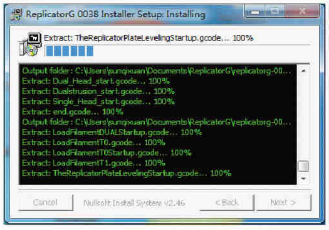
■ 打印机驱动安装及软件设置

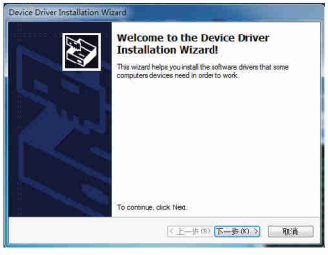
1.双击安装之前下载的replicatorg中文版，弹出如下图窗口。



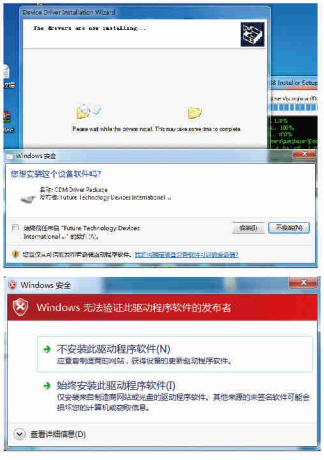
2.建议安装在默认位置，点击“Next”，弹出如下图窗口，之后点击“Install”。

3.弹出如下图窗口，安装完成后，弹出窗口，点击“下一步”。

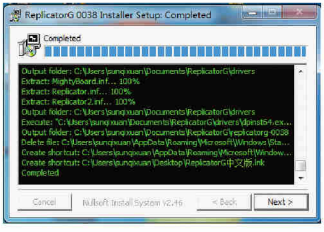




4.弹出如下图的窗口，点击安装，开始安装打印机驱动，然后在弹出的窗口中点击“始终安装此驱动程序软件”。



5.安装完成后，弹出如下图窗口，点击“完成”，最后外点击另一窗口中的“Next”。



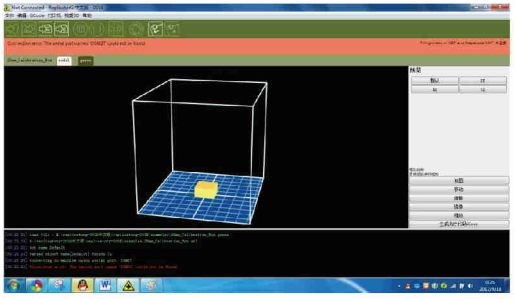
6.在电脑桌面会有一个打印软件的快捷方式，如下图。

III. 软件的安装

Chinese version

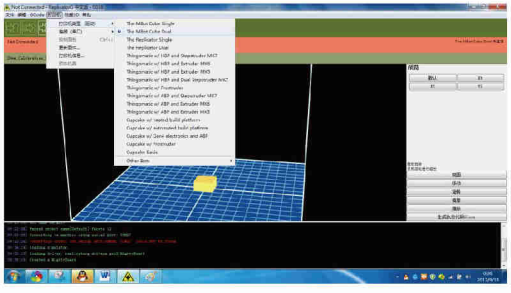
■ 3D打印软件设置

1.启动ReplicatorG中文版。
2.选择打印头与连接端口。

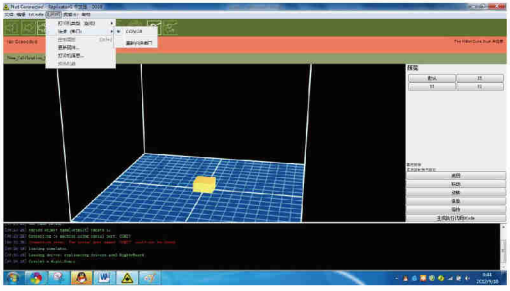


a.Gcode生成器的选择，路径为Gcode/Gcode生成器,选择Skeinforge(50)。

b.打印头的选择（打印机与电脑断开链接才可以设置），路径为打印机/打印机类型（驱动），选择The Mbot Cube Single；如果打印机是双打印头的，选择The Mbot Cube Dual。



c.选择连接端口，路径为打印机/连接（串口）/COM09，如果您是仅使用一台打印机，端口请选择最新的端口；如果您是使用多台打印机，注意端口与打印机的对应。若未显示任何串口，请点击重新扫描串口，假如还是没有，请将ReplicatorG软件关闭，再把USB线从电脑端拔下，等待5秒左右，重新插上去，打开软件，点击重新扫描串口，等待10秒，选择新的串口。



d.以上的选择确认为正确的，那么单击连接打印机图标进行连接，如下图。连接好后，Gcode生成器和连接端口是无法重新选择的；若要重新选择，则需要断开打印机与软件的连接，通过点击断开连接图标（在连接打印机图标右侧）来实现。

e.当打印机正确地连接时，工具栏下面的窗口会变为绿色，否则为红色。当打印机正常打印的时候，窗口为成为黄色。

注：当打印机不能正常连接的时候，请仔细检查电源是否有开启、数据线是否有正常连接及驱动是否有安装好。

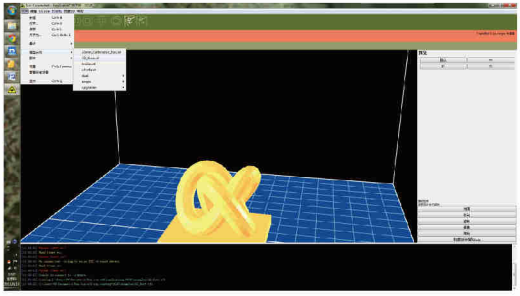
III. 软件的安装

Chinese version

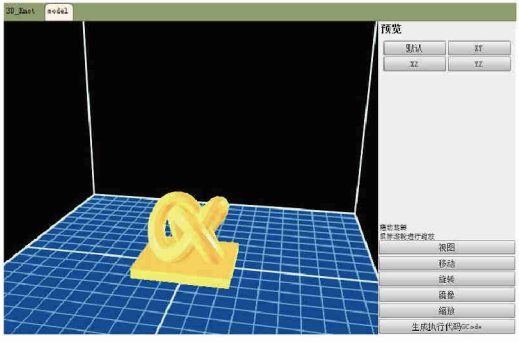
■ 3D数据设置

1.将数据导入到打印软件中

由于打印机所使用的文件格式为STL，所以需要通过Rhinoceros、Solidworks、Sketchup、UG等3D设计软件转换成软件能够识别的格式文件。再用打印机控制软件打开打开路径为：文件/打开。下面打印一个样品。选择文件/打开/3D_Knot.stl，点击打开。打开文件之后如下图。

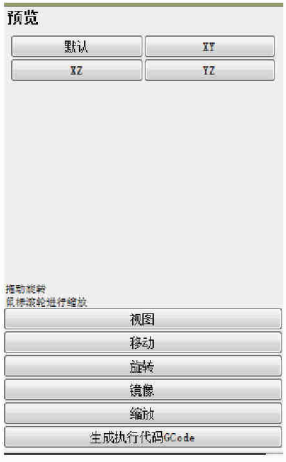


2.调整产品的位置、大小和估算打印模型时间



将产品打开后，然后根据下面的工具使用方法调整模型。

注意：调整模型时，模型不能超出方框的范围，否则无法打印，方框的底面（蓝色的平面）代表打印机中那个贴有蓝色胶带的平台。你可以滚动鼠标滚轮来进行缩放，也可以按住滚轮进行视图的旋转。五个工具位于软件界面的右下角，如图。



a.视图工具

默认：代表打印机的打印范围正对着我们（即此时我们看到模型在平面的位置与实际打印完在蓝色平台的位置是一样）。

XY：从顶部向下看

XZ：从正面向背面看

YZ：从右面向左面看

b.移动工具

居中：模型放置于平面的中心。如果你打开一个3D模型后，在软件窗口中没看见模型，请点击居中，因为模型可能放在离方框很远的地方。

放置于构建平面：模型底部会紧贴平面。打印前，任何模型底部必须紧贴平面。

X-、X+：沿X轴左右移动

勾选锁定高度：将鼠标移至方框中，单击并按住，移动模型时，高度不会变化。

c.旋转工具

Z+、Z-：沿Z轴旋转90度。

平躺：模型会水平的放置于平面，对于倾斜的模型非常有效。

打印前，强烈建议将模型平躺于平面。

勾选绕Z轴旋转：将鼠标移至方框中，单击并按住，移动模型时，将沿Z轴旋转。

d.镜像工具

反向X：在右侧平面中的镜像。

反向Y：在背面的镜像。

反向Z：在底部的镜像。

e.缩放工具

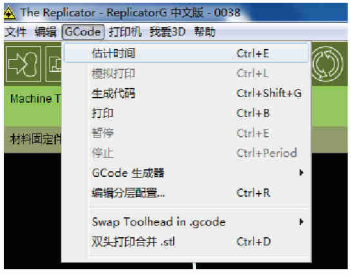
在Scale右侧方框中输入小于1的数为缩小，输入大于1的数为放大。下面的两个按钮是将模型尺寸的单位在英寸和毫米之间进行转换。点击填满构建空间，模型会最大化，达到打印范围的最大值。

III. 软件的安装

Chinese version

■ 3D数据设置

3.估算打印模型所需的时间。点击菜单栏Gcode，选择估计时间，如图。

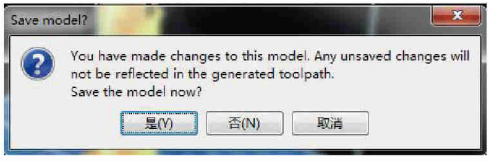


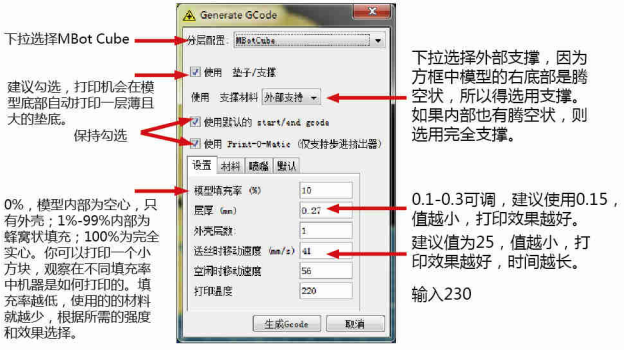
等待半分钟左右，可以在软件界面的最下面看到下图，说明打印该模型需要3小时15分钟，一般实际打印时间比估计时间大一点。

4.生成Gcode文件（对3D数据进行分层切割）

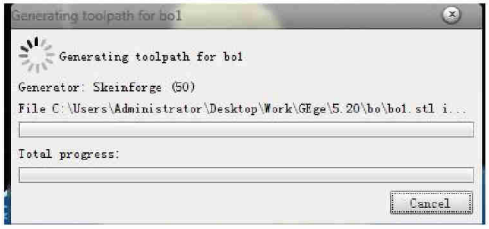
a.点击软件右下方的生成执行代码Gcode，弹出下面的窗口，这是因为我们对模型的大小和位置进行了调整，所以提示您是否要保存调整后的模型大小和位置，是否保存。建议点击是点击是之后模型将开始生成Gcode。

b.打开后，点击生成执行代码Gcode，弹出下面的窗口，左右为注解。

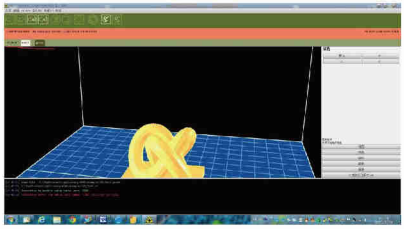




c.设置好后，点击生成Gode按钮，弹出下面的窗口 。



d.生成完Gcode代码后，软件界面变为下图，model旁边多了一个gcode。

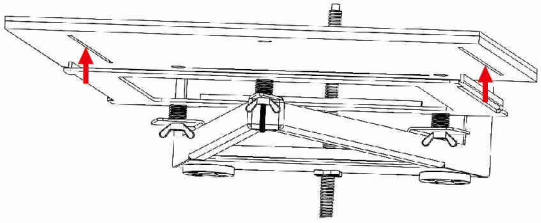


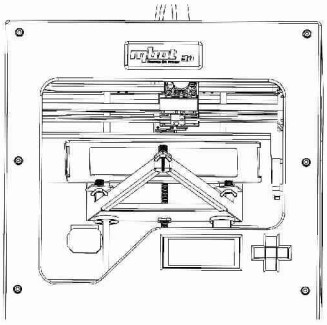
IV. 初次打印的准备

Chinese version

■ 打印平台的调平

将打印平台上升到最高点，触碰到限位后开关停下，此时，旋转打印平台下面的羊角螺母，保证打印头与打印平台之间相距1mm。开始打印后，请注意观察打印头打印的垫子，保证打印出的垫子相邻两条线之间有细小的缝隙即可。





■ 启动

打开机器电源开关，液晶显示屏会显示机器固件版本。然后，会跳出一个打印头错误的警告。由于机器刚开机系统会对机器的一个温度进行测试，理论上是没有温度的。但机器实际上是跟室温相同的，所以会出现个报警提示温度错误。直接按旁边的五个蓝色按钮的中键即可解除报警。警报解除后，将数据线的另一端连接至计算机。

■ 打印头测试

第一次使用时需测试打印头，以后则不需要进行该步骤。

1.在软件控制面板选择  之后弹出窗口，如右图：

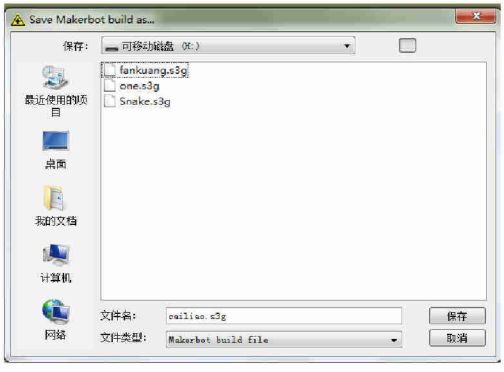
2.打印头温度达到设定温度（PLA：195-220摄氏度；ABS：230-260摄氏度，建议PLA210摄氏度、ABS240摄氏度）时，将打印耗材穿过导管，插入打印头顶部的圆孔，并尽可能推到插孔底部。点击控制面板的正向，并用手抓住材料，刚开始时稍微用点力往下压，当材料在慢慢下去时，手可以放开，之后打印头会正常吐丝。在这个过程中打印头可能会有“哒、哒、哒“的响声（更换材料时也有可能引起），请用力按压材料25秒左右，之后响声会消失。

V.打印

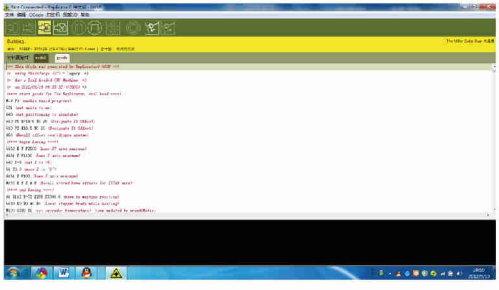
Chinese version

■ 通过SD卡打印（推荐）

1.将SD卡插入电脑卡槽，当生成完Gcode后，点击”创建通过SD卡打印的文件”图标弹出窗口，如下图，找到SD卡在电脑中的磁盘并打开。



然后填入文件名，文件名必须为非汉字名称且不能超过20个字符，格式为s3g或者x3g（具体根据固件版本不同而不同6.2以及6.2以下使用S3G格式7.2固件使用x3g格式）。



2.当Gcode文件保存完，拔出SD卡，将它插入打印机SD卡槽中，通过显示屏右侧的按键选择Print from SD，按右侧按钮组的中心确定按钮，通过上下按钮找到保存的文件，如下图。

3.按确定按钮，打印机进入预热状态，显示屏显示如下图。

4.如果你想取消打印，请按一下按钮组的左按钮（返回按钮），显示屏显示如图。

5.然后，选择Yes，按确定按钮，打印机停止打印，显示屏恢复初始状态。

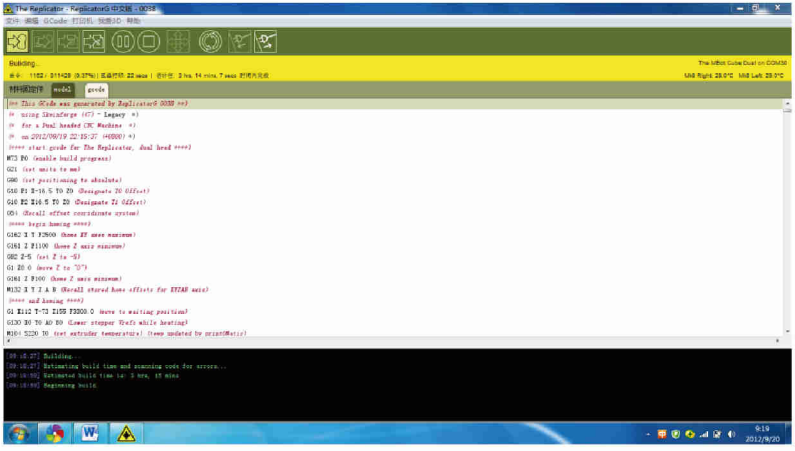
V.打印

Chinese version

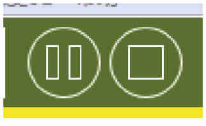
■ 通过电脑打印

1.点击软件左上角的打印图标，如图。

2.软件界面变为下图，打印机开始移动，之后会停在某个位置，进行预热。当打印头温度达到设定温度时（软件界面的右上角），打印机开始吐丝打印。



3.如果你想暂停或停止打印，可以点击下图中的图标。
注意：刚开始打印时（工具栏下面为黄色时），点击暂停或停止是无效的，你可以通过关闭软件来实现暂停。打印中，点击暂停，因个人电脑配置不一样，有时需要等待半分钟才能暂停，不能重复点击。



4.打印完成后，如下图，之后用手或铲子取出模型。
注意：最后，关闭打印机时，首先点击软件界面的断开图标，如下图，再关闭打印机电源。

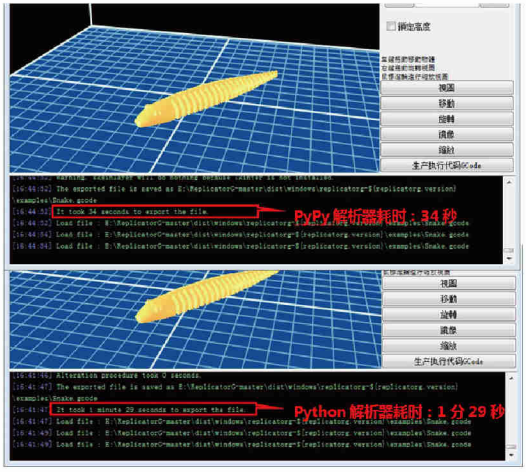
VI.PyPy加速设置方法

Chinese version

在新版ReplicatorG操作软件中，GCode代码生成解析器比先前多了一个PyPy解析器，在相同设置下转换相同的模型时，PyPy的速度比传统的Python提高了2-3倍。两种解析器当然都有自己的优点，虽然Python处理慢，但是它性能更加稳定，而Pypy优于它的运行处理速度。下面就介绍一下PyPy加速设置的方法，用户可根据自身需要选择使用。

PyPy和Python解析器速度比较

	模型(Snake)	Whistle	3D_Knot
Python	1分29秒	1分30秒	2分37秒
PyPy	34秒	37秒	1分10秒



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 (ARMEL/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

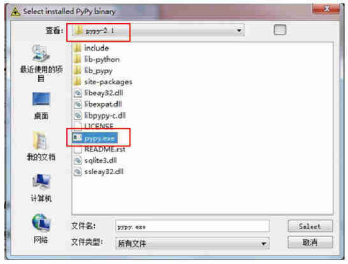
VI.PyPy加速设置方法

Chinese version

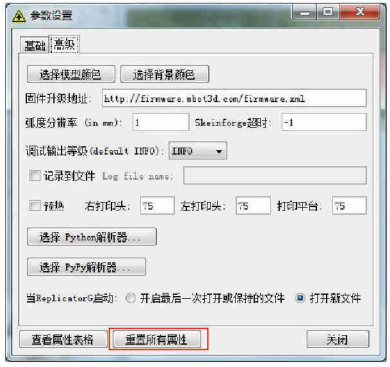
2.下载完成后，将Pypy压缩文件解压缩在C盘根目录下。
启动ReplicatorG软件，选择“文件-设置”。

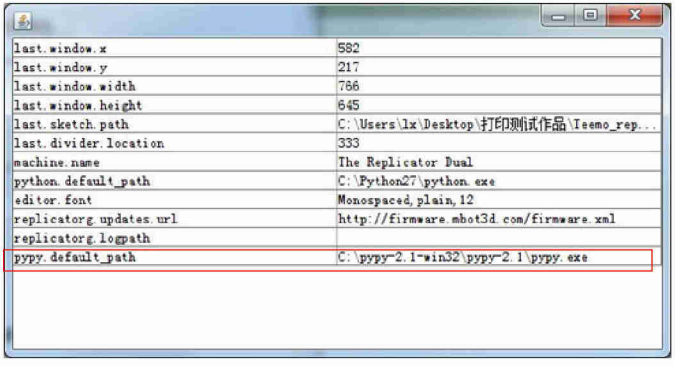
3.在弹出的设置界面中选择“高级”选项中的“选择Pypy解析器”。

4.最后，在Pypy安装目录下，选择“pypy.exe”文件，点击“Select”。



5.注意：通过参数设置中的“查看属性表格”按钮可以查看到当前所使用的解析器，以检查先前步骤完成是否正确。





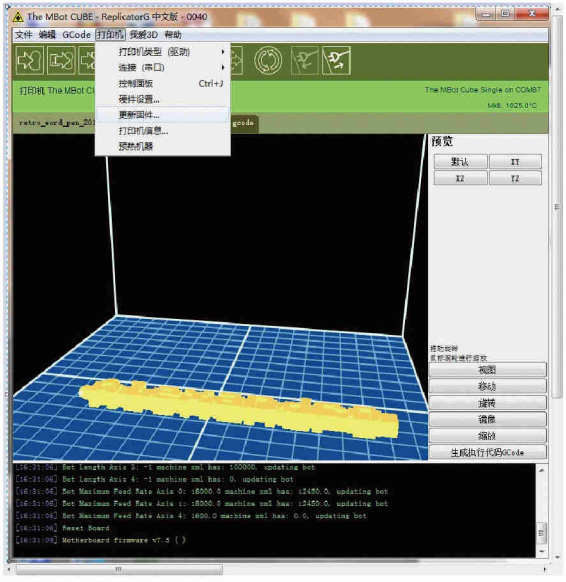
last.window.x	582
last.window.y	217
last.window.width	766
last.window.height	645
last.sketch.path	C:\Users\lx\Desktop\打印测试作品\Teemo_rep...
last.divider.location	333
machine.name	The Replicator Dual
python.default_path	C:\Python27\python.exe
editor.font	Monospaced,plain,12
replicatorg.updates.url	http://firmware.mbot3d.com/firmware.xml
replicatorg.logpath	
pypy.default_path	C:\pypy-2.1-win32\pypy-2.1\pypy.exe

VII.固件升级

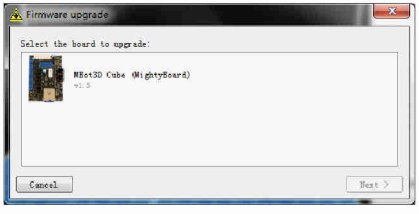
Chinese version

1.升级前，请打开ReplicatorG软件，选择“文件-设置-高级”，确认“固件升级地址URL”为：
http://firmware.mbot3d.cn/firmware.xml，如若不符请修改。

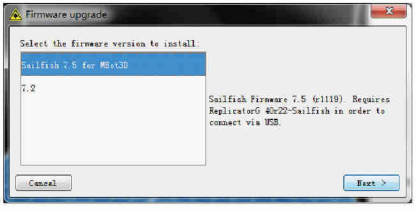
2.先用数据线连接好电脑与打印机，在ReplicatorG软件菜单栏选择打印机按钮，在下拉菜单中选择“更新固件”。



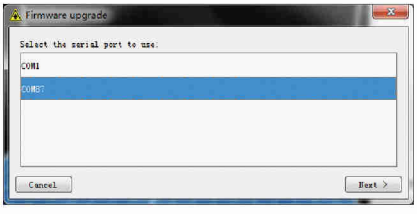
3.选择下图主板类型，点击Next。



4.选择将要升级的版本，点击 Next。

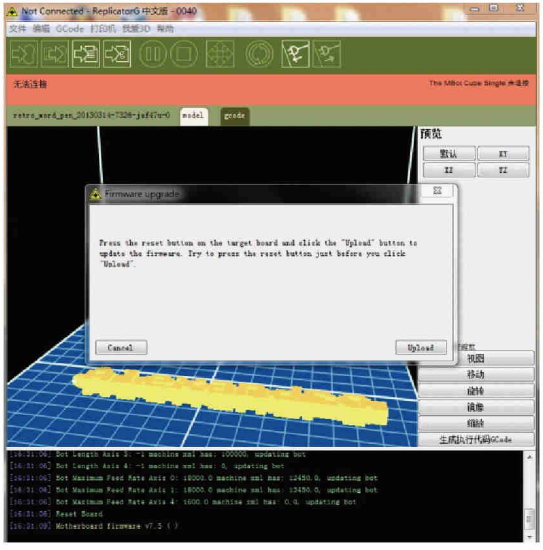


5.选择打印机与您电脑连接的端口，点击 Next。

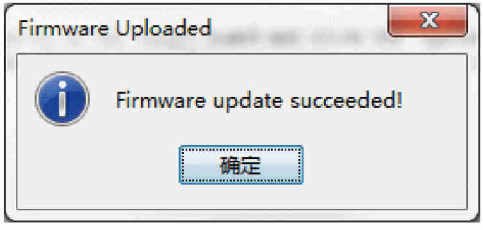


VII.固件升级

6.此时，软件会提示与打印机断开连接，如图所示。



7.接下来，请在单击Upload按钮之后的1-2秒内按下打印机上的复位键（复位键位于打印机数据线接口边上）。升级过程中，主板上的信号灯会不停闪烁，大约一分钟左右升级完成。若升级成功，软件将弹出如下对话框。



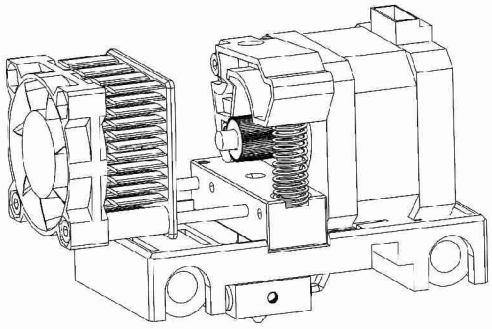
8.加入升级失败，软件将弹出如下对话框。原因可能是在点击Upload之后没有及时按下复位键，请点击确定，并重复第7步。

VIII.故障诊断与排除

Chinese version

清理打印头

长时间使用打印机后，打印电机齿轮会积累很多碎屑，需要及时清理，以保证机器的良好运作。清理方法如下，松掉风扇下边的两颗螺丝，取掉风扇后面的电机，使用小刀把齿轮上的碎料清理干净，把电机装回原来的位置，紧上风扇的两颗螺丝即可。



打印机的校正

打印机使用一段时间后，若发生打印出的东西与设计的形状不一致的情况，请在打印机液晶屏上选择Home axes，XYZ轴会自动移到触碰到限位开关的位置；然后，打开ReplicatorG软件，通过控制面板，CUBEII型号移动X轴到130位置，CUBE及CUBE PVC型号移动X轴到100位置，Y轴均为60位置；点击文件-脚本-校正-Mbot校正-确定-确定，打印头会移动到机器右后方，打印底板上升到最高点，软件将询问是否保存，点击确定，校正完毕。

清理打印平台

CUBEⅡ的打印平台是可拆卸的，所以可以先把打印平台连同打印物体一同取下（打印物不大的情况下），如果打印头与打印平台的距离过近的话，会很难铲下，需要使用铲刀及小锤。然后，使用铲刀先撬开打印物的四边，再直接取下打印物体。清理完成后，将打印平台装回原位并调平。

打印机无法连接电脑

请检查是否下载了与您所购机型对应的软件版本，在软件上选对打印机类型（驱动），MBot Cube，单头机型选择single，双头机型选择dual，并重新扫描连接串口。如果按此方法仍然无法解决问题，请与我们的客服人员联络，获得相关技术支持。

XY轴移动时异响

将主板上的XY轴电机线互换，打开ReplicatorG软件，通过控制面板移动XY轴，然后将XY轴电机线接回原位，再次观察XY轴是否能够正常运作。如果按此方法仍然无法解决问题，请与我们的客服人员联络，获得相关技术支持。

打印时出现翘边

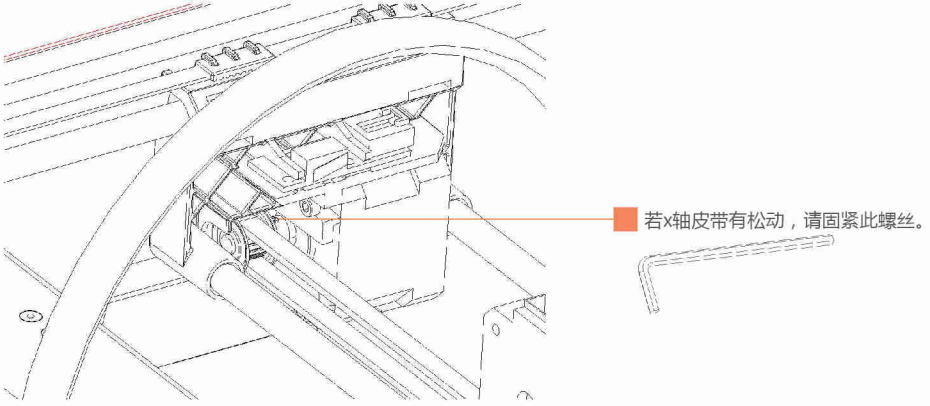
观察打印模型翘边的位置，调整打印底板下面的羊角螺丝，对应翘边的位置将打印底板调高；尽量将机器放在密闭空间执行打印，减少空气的流动。另外，确认底板的四角与打印头的的距离是否等距，具体调节方法请参照手册中“打印材料接触不到底板”部分进行调节。

VIII.故障诊断与排除

Chinese version

X轴皮带松动的调节

长时间使用打印机后，X轴皮带会出现松弛的现象，会造成打印物体X方向错层的现象，需要及时绷紧，以保证机器的良好运作。调节方法如下，用下图所示小工具松掉X轴电机上四颗黑色螺丝，然后把X轴电机往右边稍用力扳动，同时紧上这四颗螺丝即可。之后，用手轻轻向下按压皮带，上皮带碰到下皮带，如果松手后上下皮带很快分开了，则说明皮带已经绷紧。

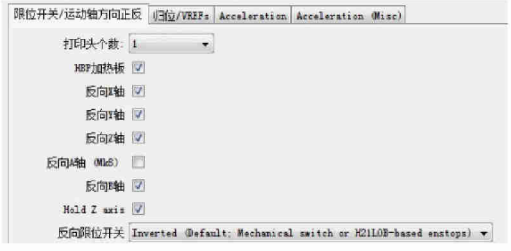


打印材料接触不到底板

先将打印底板调整到最高位置，然后通过调节打印底板下方的羊角螺丝，打印头与打印底板之间的理想距离为0.5mm-1mm，即一张70gA4纸对折的厚度，可以在调节过程中参照此厚度，将距离调节为纸张在打印头与底板之间能觉得到头对纸张有摩擦并又能正常将纸张取出，调整时可使用打印机菜单中的Level build plate指令辅助调节。

打印过程中X轴运动方向相反

首先将打印机连接到电脑，打开ReplicatorG软件，在上方的工具栏打印机-硬件设置中，把X轴前面的勾去掉。如果按此方法仍然无法解决问题，请与我们的客服人员联络，获得相关技术支持。



VIII.故障诊断与排除

Chinese version

打印精度不够

打开ReplicatorG软件，在生成执行代码Gcode里调整以下参数，如果想提高精度则设置成0.18-0.2，0.27为默认值。如果按此方法仍然无法解决问题，请与我们的客服人员联络，获得相关技术支持。

打印头不吐丝

若打印头不能正常吐丝，请尝试以下步骤：检查材料是否插入正确的进料口；将打印头的温度要设置调高至235-240（ABS）或190-230（PLA）；拆开打印头，将送料齿轮与轴承之间的距离调大，如果距离太窄，会导致料送不进去；如果在打印刚开始时候不出丝，请用手按压25秒之后再试试看；最后推荐使用SD卡进行打印，因为SD卡打印是把模型运算成一个结构转化成XTL格式，用电脑打出的模型会导致破面（模型错误）。

疏通打印喷嘴

如果出现打印头不吐丝，但风扇和齿轮都能转，可能是堵料的情况，需要疏通打印喷嘴。首先将风扇下面的螺丝拆开，在打印头加热状态下，用拉直的回形针穿过进料孔，插入打印喷嘴，尽可能往里推。轻轻地推送回形针，直到感觉到了阻力。然后重新装载耗材，尝试再次吐丝。注意：在配置和运行过程中，打印头温度非常高。请勿触摸打印头。

打印模型完成品偏移

若打印模型完成品偏移，可能由三种原因造成：XY轴皮带松动、X轴倾斜或者同步轮螺丝松动。若X轴皮带松动：调松X轴电机的固定螺丝，把电机向右边扳动，同时紧上螺丝；若Y轴短皮带松动，调松Y电机的固定螺丝，把电机往下扳动，同时紧上螺丝；若Y轴长皮带松动，调松机器左前位置细杆上的同步轮螺丝，然后调紧左右长皮带，注意两边同步轮齿数须一致，最后上紧机器左前位置细轴的同步轮螺丝。若发现X轴倾斜，右手握住X轴右塑料件，左手握住X轴左塑料件，依据倾斜情况，扳正X轴，可利用顶板沿辅助校正。若同步轮螺丝松动：上紧细杆上的同步轮螺丝即可，注意电机上的同步轮需要螺丝孔的位置对准电机轴上的平面才能上紧螺丝。

TIPS

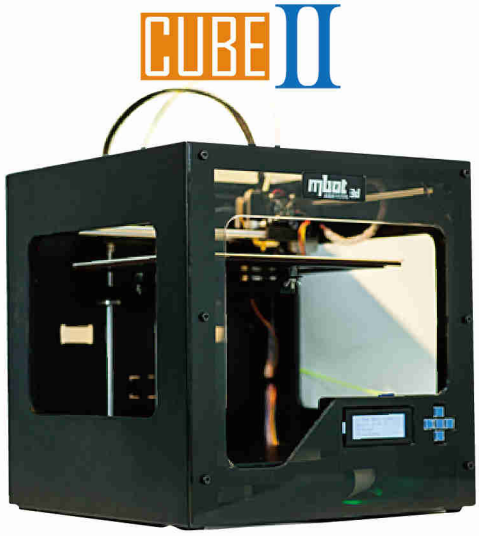
1、建议工作环境温度在25度至30度之间。
2、切勿接触水源，否则会造成机器的损坏。
3、打印时打印头喷嘴温度会高于200度，请注意避免烫伤。
4、ABS耗材打印时会有异味产生，请保持空气通畅。

TABLE of CONTENTS

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

Specifications

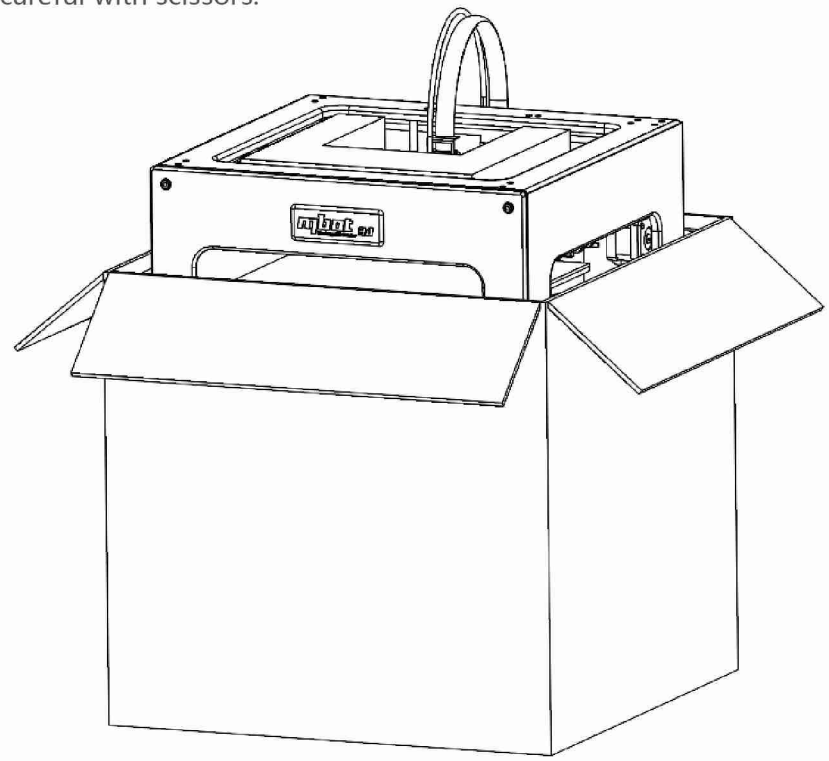


PHYSICAL DIMENSIONS	
Build Volume	260mm×230mm×200mm(x/y/z)
With Spool	405mm×405mm×410mm
Shipping Box	520mm×520mm×520mm
Shipping Weight	18 KG
ELECTRICAL	
AC Input	100-240V, ~2amps,50-60 Hz
Power Requirements	24V DC @ 6.25 amps
Connectivity	USB, SD card [included]
MECHANICAL	
Chassis	Metal steel
Front 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

Unpacking your printer

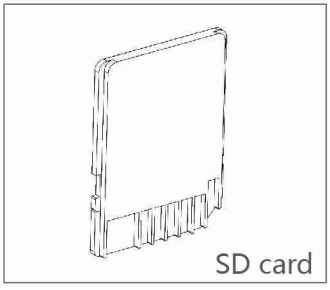
1. Place the box on the ground and open it up.
2. Slowly take MBot CubeII out of the box by grasping the upper frame with two hands. Place it on a sturdy table.
3. Gently remove all the fixtures holding parts in place for transport. Be careful with scissors.

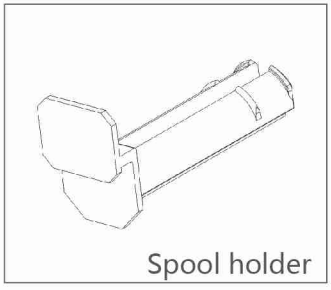


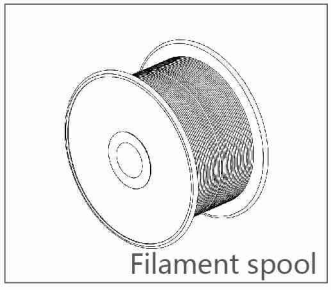
I.Meet the MBot CubeII

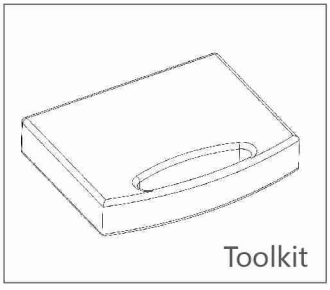
What’ s included

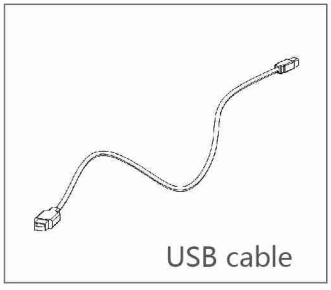
The box contains the following accessories. If anything is missing or damaged, please contact your sales representative from whom you purchased the printer.

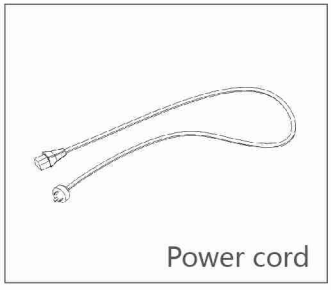

SD card


Spool holder


Filament spool


Toolkit


USB cable


Power cord

I.Meet the MBot CubeII

At a glance

[1] LCD panel

[2] Function buttons

[3] Threaded Z-axis rod

[4] Build platform

[5] Build plate

[6] Feed tube

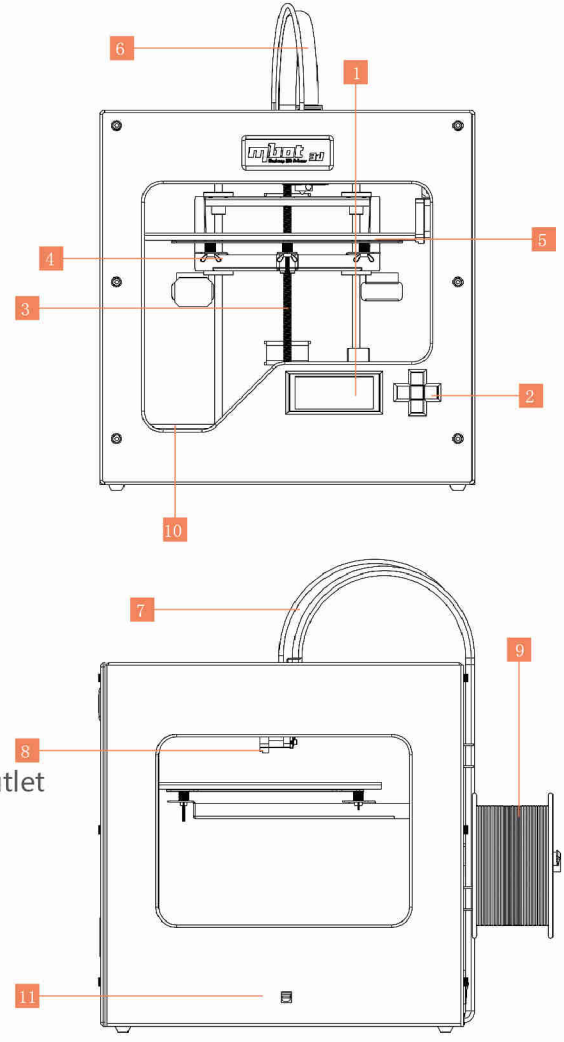
[7] Extruder cable

[8] Nozzle

[9] Filament spool

[10] Salvaged material outlet

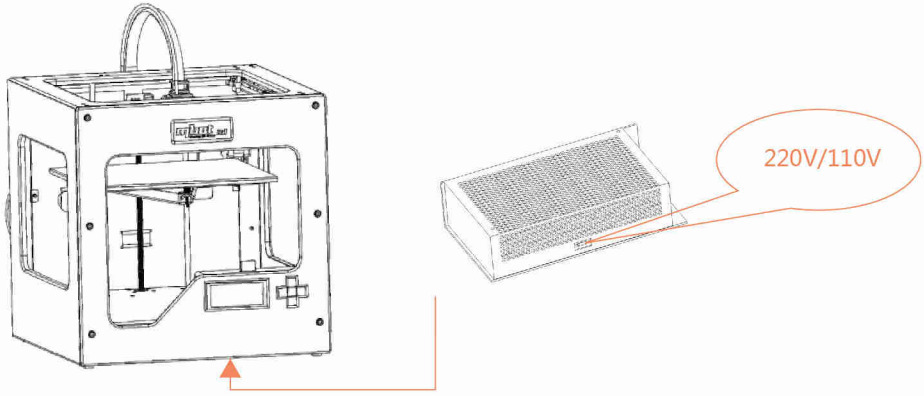
[11] USB port



II.Setting up your MBot CubeII

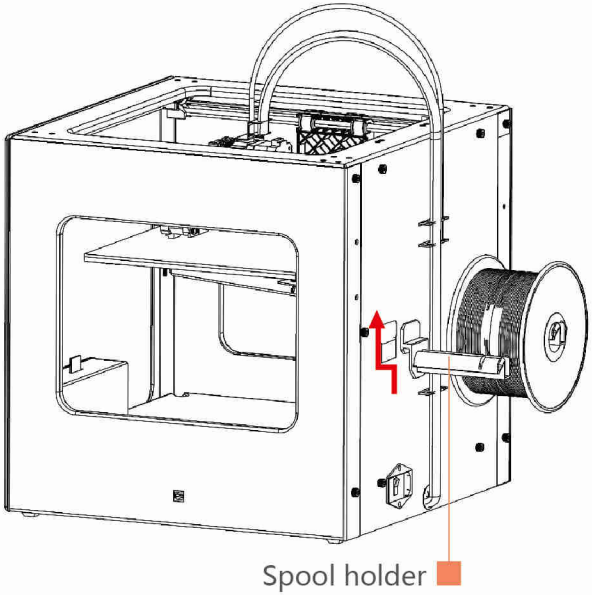
Power switch

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

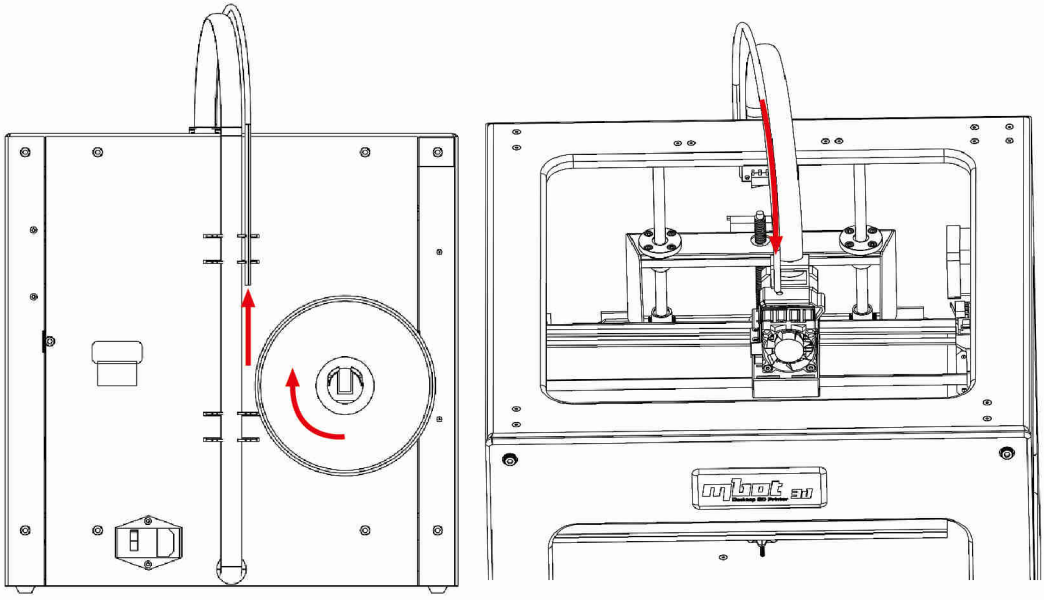
Tilt the spool holder and insert it into one of the holder mounts on the back of the printer. Then, fit your filament spool onto the installed holder.



Loading filament

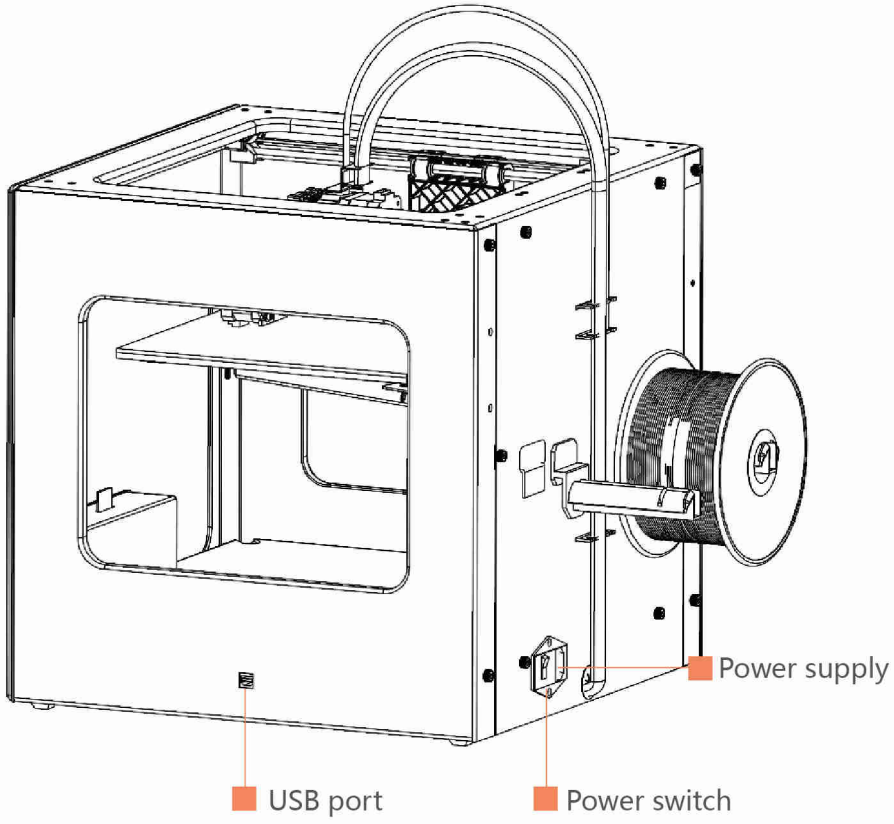
Open the package and take out the filament spool. Fit it onto the right holder on the back of the machine. Make sure the spool spins clockwise (when viewed from the back of the machine) when printing, and that the end of the feed tube isn’ t lower than the spool holder, as shown below. Then, push filament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



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.

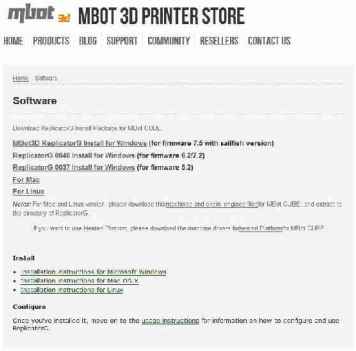


III. Installing software

英文版

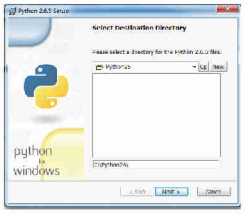
■ Setting up the operating environment

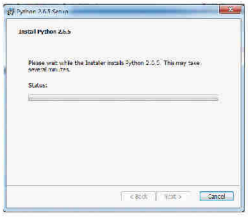
1. Go to http://www.mbot3d.com/downloads, http://www.python.org/download/,and download ReplicatorG and Python2.7.



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.





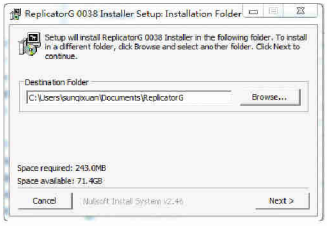
4. Click the "Finish" button to complete the installation.

III. Installing software

英文版

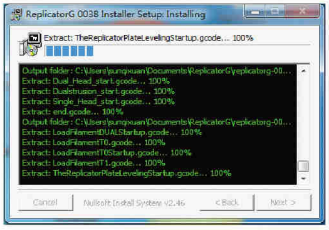
■ Installing and setting up printer driver

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

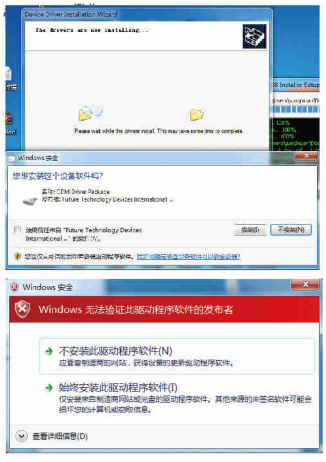


2. Click the "Next" button. Then on the following window, click the "Install" button.
Suggest using the default destination folder.

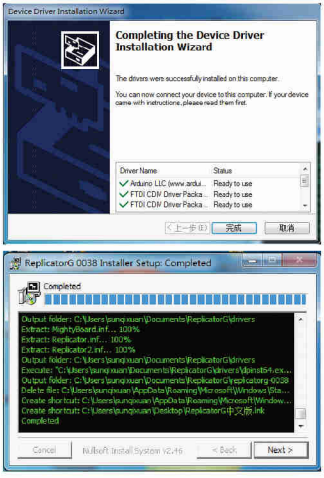
3. You' ll see the installer working as shown below. Once done, the Device Driver Installation Wizard pops up. Click the "Next" button to install the driver for ReplicatorG.



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



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 .



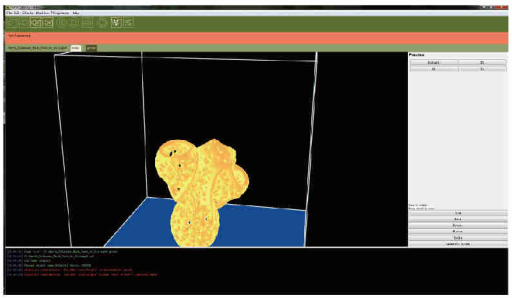
6. A short-cut icon of ReplicatorG is created on the desktop of your computer.

III. Installing software

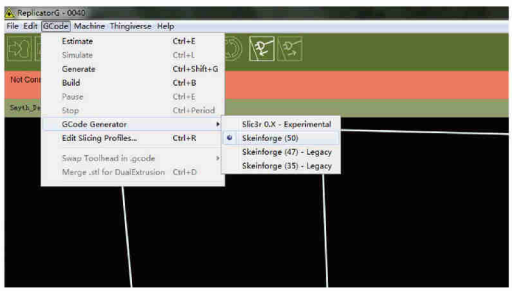
英文版

■ Configuring 3D printing software

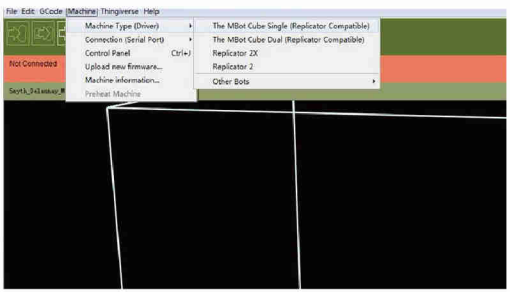
1. Run ReplicatorG.
2. Choose extruder and connection serial port.



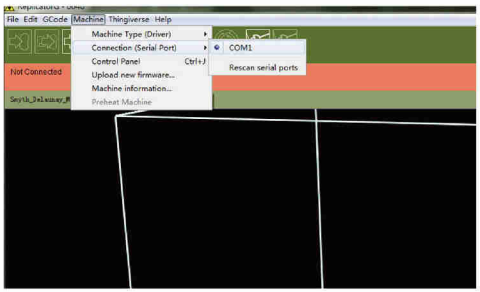
a. Click GCode->GCode Generator, and select "Skeinforge(50)".



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).

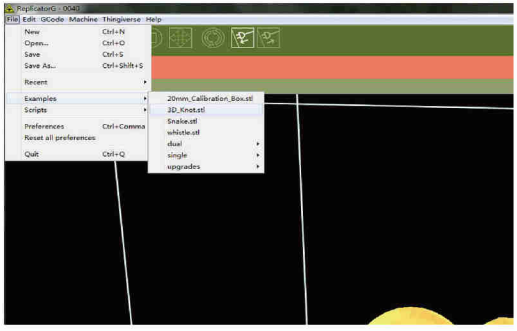
e. When the machine is connected successfully, the status bar below toolbar turns green. Otherwise, red. When the machine is running normally, it turns yellow.

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.

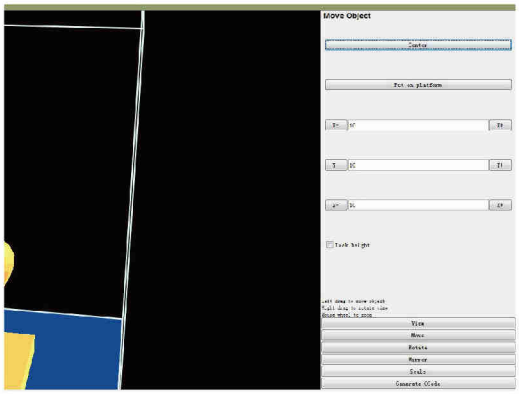
III. Installing software

■ Setting up 3D data

1. Importing model file into ReplicatorG
The machine supports STL and OBJ model files. You can use 3D design software (such as Rhinoceros, Solidworks, Sketchup, UG, etc.) to convert file format.
Open file by selecting the "File>Open..." menu option. Here we' ll print a sample. Select "File->Open->3D_Knot.stl" and click "Open" .
Now you'll see the 3D model you've selected as shown below.



2.Manipulate the model and estimate build time



After opening the model file, you can position it as follows.
NOTE: When adjusting, please make sure the model is enclosed in a box representing the size of your machine's build envelope. Otherwise, the model can' t be built. The bottom of the box (i.e. the blue platform) stands for the build bed with blue tape in your printer.
The model can be scaled by scrolling the mouse wheel. The view can be rotated by holding the mouse wheel and moving.
There' re five buttons at the lower right corner of the window.

a. View
Default: The build area is facing us (i.e. the orientation of the model in view is exactly the same as in build bed when finishing printing).
XY : Top view
XZ : Front view
YZ : Right view
b. Move
Center: Place the model in the middle of the platform. If the model can' t be seen after opening the file, which means it may be far from the printable area, please click the "Center" button.
Put on Platform: The model is rested on the surface of the platform, not suspended in air or below the platform. Check it before printing.
X—、X+: Move left or right in X-axis.
Lock Height: When it' s checked, the height won' t change while holding mouse to move the model.

c. Rotate
Z+、Z— : Rotate your model by 90 degrees in Z axis.

Lay Flat: It keeps the model in balance, which is very helpful for inclined models. Strongly recommend using this function before printing.

Rotate around Z: When it' s checked, the model rotates around Z-axis by holding the mouse and moving.

d. Mirror
Inverted X: Right mirror image.
Inverted Y: Back mirror image.
Inverted Z: Bottom mirror image.

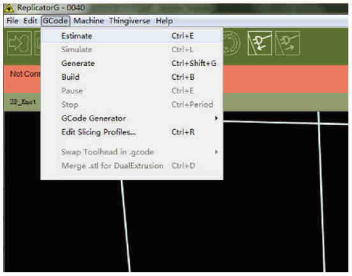
e. Scale
Input numbers to scale. When the number is less than 1, the model is scaled down. When it' s greater than 1, the model is scaled up.
The options below are to convert model dimension between inch and millimeter. Click the "Fill the Build Area" button to maximize the model, which is the maximum print size.

III. Installing software

英文版

■ Setting up 3D data

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

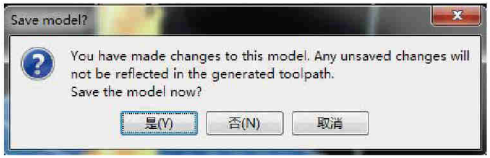


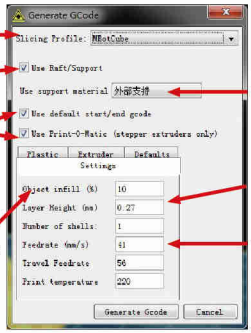
After about 30 seconds, the estimation is displayed at the bottom of the window (as shown below). It may take 3 hours and 15 minutes to build our sample. Usually, it takes longer than estimated.

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.

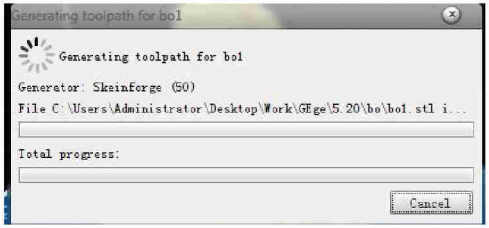
If you're following our example, please select "Outside" support, as our sample model has no material beneath to support it on the right.
If the model has overhanging features inside, please select "Full" support.

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

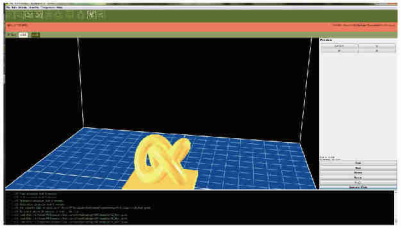
Suggest inputting 25. The smaller, the better, but it takes more time to build.

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.

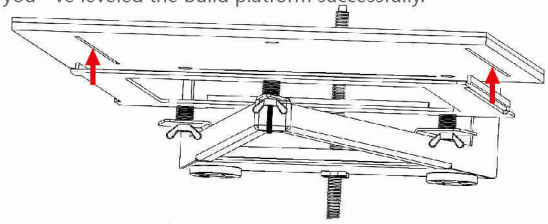


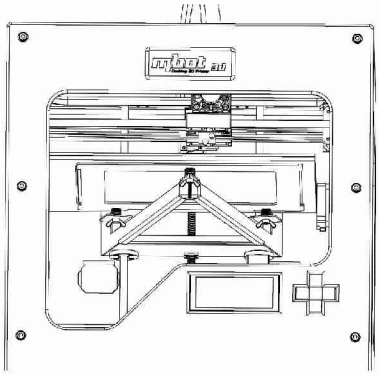
IV. Pre-print checks

英文版

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.

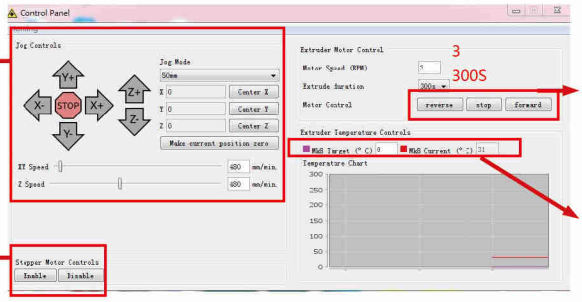
Test printing

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.

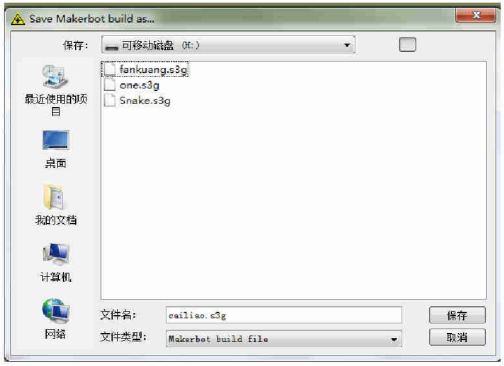
2. Once the nozzle reaches desired temperature (PLA: 195-220°C; ABS: 230-260°C; Suggest 210°C for PLA and 240°C for ABS), load filament as shown below. Thread filament through feed tube, and insert it into the hole in the top of the extruder, pushing until it touches the bottom of the hole. Click "Forward" 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.

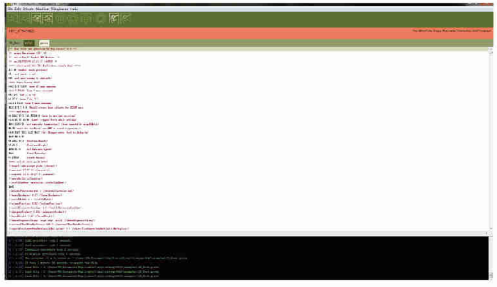
V.Printing

Printing from SD card (Recommended)

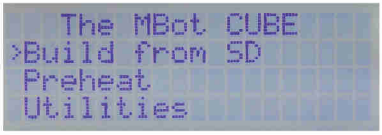
1. Make sure your SD card is plugged in the SD card slot of your computer. After GCode is generated, click the icon as shown below. On the pop-up window, find and open SD card.



Input file name and save in s3g or x3g format. Make sure the file name isn't in Chinese and over 20 characters. Otherwise, the printer may make errors or can't read. (s3g for firmware version 6.2 or lower, x3g for firmware version 7.2)



2. After the GCode file is saved, pull out the SD card from your computer and insert it into the USB port on your printer. Select "Build from SD" and choose the file, by up and down arrow keys beside the LCD panel. Press the center key to enter after selecting.



3. After selecting file and pressing the center key, the printer starts to heat up. The LCD panel displays as below.

4. If you want to cancel building, please press the left arrow key (i.e. the back button). A message appears as below.

5. Select "Yes" and press the center key, to stop building. The LCD panel returns to home screen automatically.

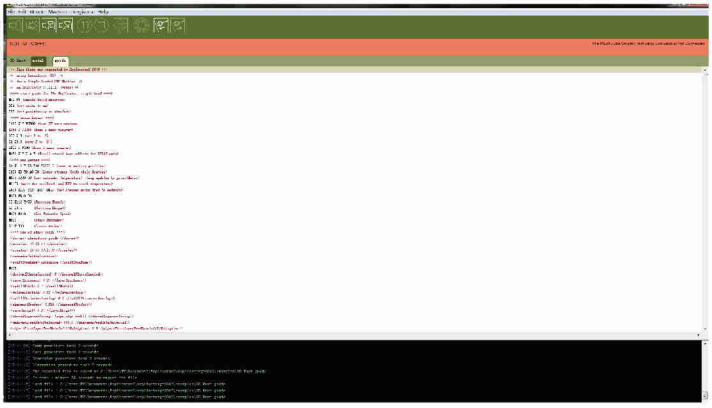
V.Printing

英文版

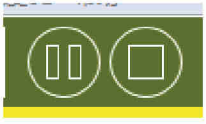
■ Printing from computer

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).

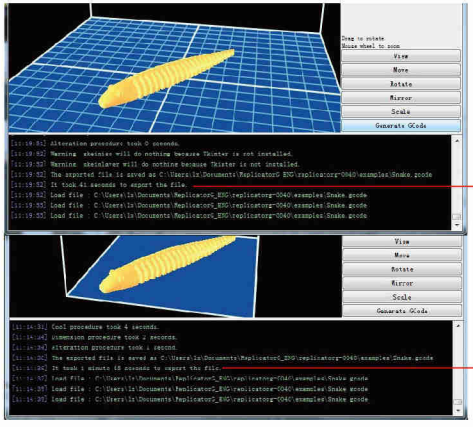
VI.PyPy Acceleration

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



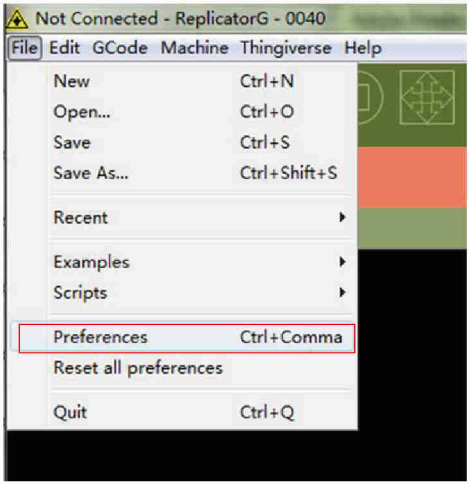
1.打开http://pypy.org/download.html在下图中，如果是Windows系统用户，选择红色框位置下载Pypy。

- 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 (ARMEL/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

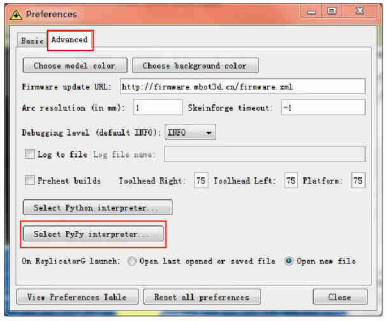
VI.PyPy Acceleration

英文版

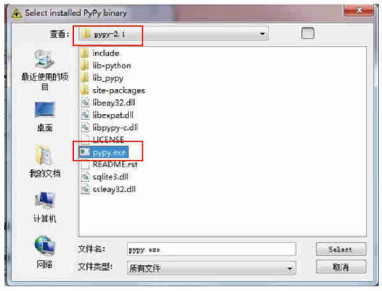
2. After downloaded, unzip PyPy to the root folder of the C drive. Start ReplicatorG and select "File -> Preferences".



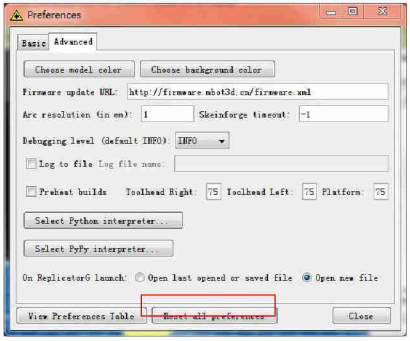
3. On the pop-up window, click "Select PyPy interpreter..." button under the "Advanced" tab.

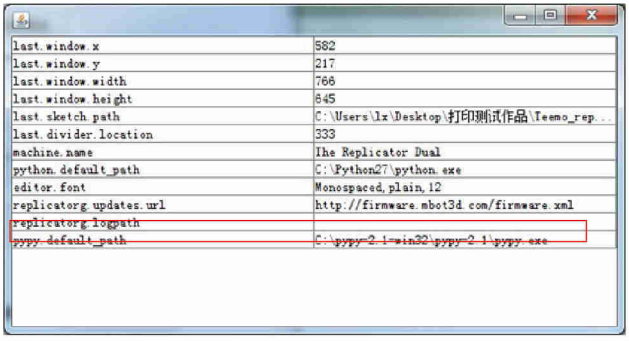


4. Find the installation directory and select "pypy.exe". Then, click "Select" button.



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



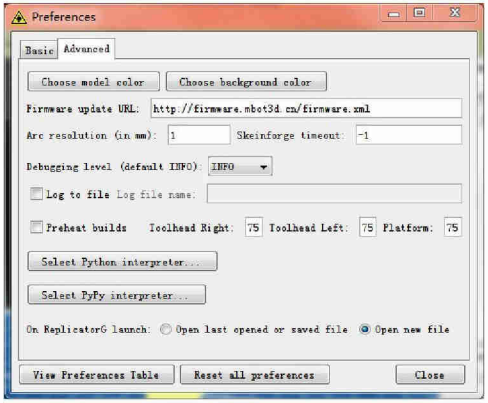


last.window.x	582
last.window.y	217
last.window.width	766
last.window.height	845
last.sketch.path	C:\Users\lx\Desktop\打印测试作品\Teemo_rep...
last.divider.location	333
machine.name	The Replicator Dual
python.default_path	C:\Python27\python.exe
editor.font	Monospaced, plain, 12
replicatorg.updates.url	http://firmware.mbot3d.com/firmware.xml
replicatorg.logpath	
pypy.default_path	C:\pypy-2.1-win32\pypy-2.1\pypy.exe

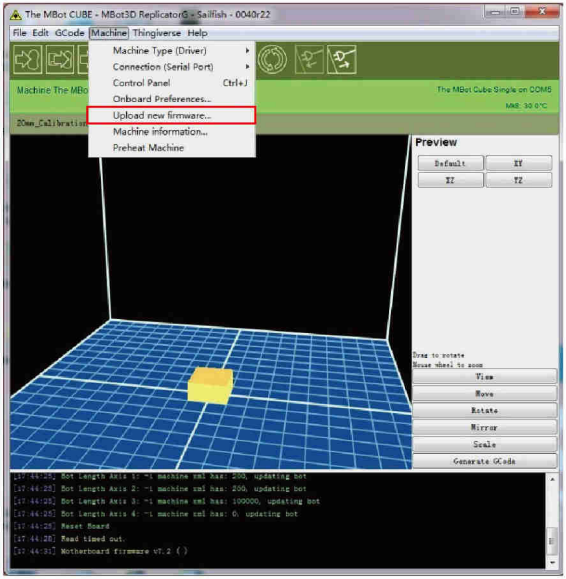
VII.Updating firmware

英文版

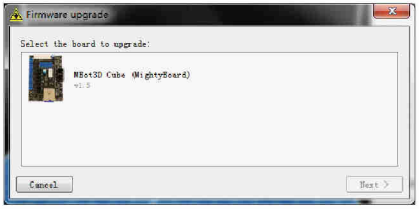
1. Before updating firmware, please open ReplicatorG and select File-> Preferences -> Advanced to check “Firmware Update URL”(http://firmware.mbot3d.cn/firmware.xml). Otherwise, please input this URL.



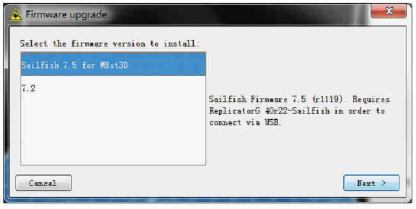
2. Connect the printer to your computer with USB cable. Go into ReplicatorG's Machine menu, and choose "Upload new firmware".



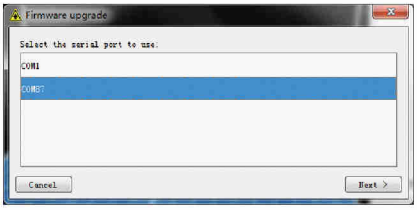
3. Select the board you’ re upgrading as shown below and click “Next”.



4. Choose the newest version of the firmware and click “Next”.

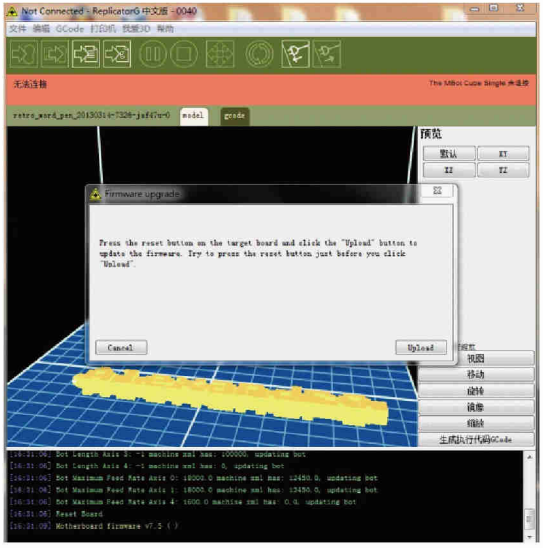


5. Select the serial port connected to your computer and click “Next”.

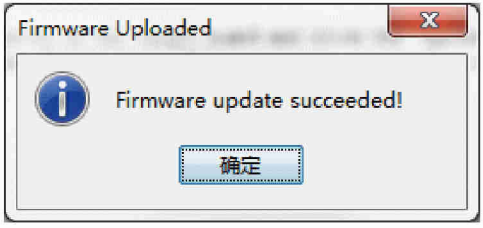


VII.Updating firmware

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.

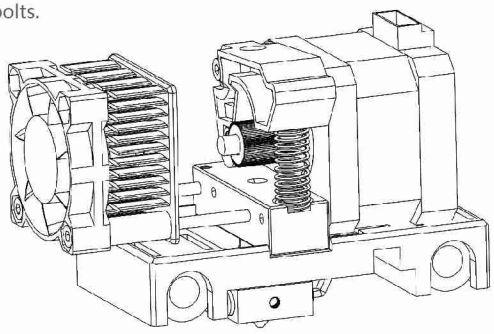


8. If update failed, the message displays as below. It may be because you waited a little longer between hitting the upload button and pressing the reset switch. Please click “OK” and try step 7 again.

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, reseat 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, reseat 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.

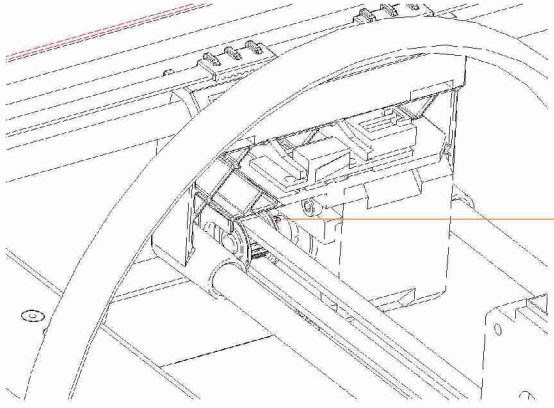
Warping when building

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

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.



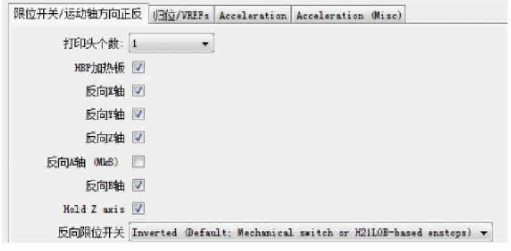
If X-axis belt is loose, please tighten the screw.

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

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.

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.

NOTES

联系我们 CONTACT US

再次感谢您选择使用MBot个人3D打印机产品！

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Thanks again for choosing MBot personal 3D printer!

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Email: info@mbot3d.com
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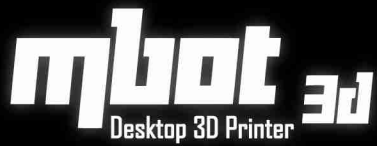
Skype: mbot3dsupport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Desktop 3D Printer