

Welcome to M3D's Alpha Edition release of desktop software powering the Micro 3D printer on Linux!

This file outlines prerequisites and steps required to get started with your printer and desktop software.

This Linux software has been deployed using Ubuntu versions 14.04 LTS and 16.04 LTS. We expect the software to be compatible with most, if not all, flavors of Debian Linux, as well as other variants, but have not been able to test across the full diversity of operative systems. We are very interested to hear what specific platforms our users are running on and what results they are having.

1. In addition to the base operating system noted above, our software requires the mono runtime version 4.2.3 or above. Included are directions to install, which have been extracted from the website at <http://www.mono-project.com/docs/getting-started/install/linux/> if you would like to independently verify before executing these steps. If you already have mono 4.2.3 or later installed, you may skip these steps.

(If you would like to know if mono is installed, you can check this and its version by executing `mono -V` from terminal; however we recommend NOT installing `mono-runtime` if your operating system prompts you that mono is not currently installed and suggests a command to do so. Rather, follow the instructions here. Many Linux release vendors do not point to the latest mono runtime, so these steps will first allow your Linux installation to view the latest packages published by Xamarin.)

From the terminal, run the following (the commands to type follow the '>' command prompt indicator):

```
> sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv-keys
3FA7E0328081BFF6A14DA29AA6A19B38D3D831EF

> echo "deb http://download.mono-project.com/repo/debian wheezy main" | sudo tee
/etc/apt/sources.list.d/mono-xamarin.list

> sudo apt-get update
```

Finally, it is recommended by Xamarin that you run a package upgrade against your current system prior to proceeding. NOTE: Depending on the frequency of upgrades that you execute, this may take a bit of time.

> `sudo apt-get upgrade`

(enter `Y` to continue with the upgrade)

Now you are in a position to install mono – only the base runtime is required (`mono-xsp4` package with dependencies).

> `sudo apt-get install mono-xsp4`

(enter `Y` to continue with the install)

We can verify that mono has installed successfully under most circumstances with the following commands:

> `which mono`

(expect output of `/usr/bin/mono` under ordinary circumstances)

> `mono -V`

(the latest stable release version of mono at the time of writing these instructions was "Mono JIT compiler version 4.4.0"; however any version 4.2.3 or later is acceptable)

2. You may choose to install the M3D software (see step 4) ahead of physically connecting your printer; however, we recommend connecting your printer to the computer *prior to opening the M3D desktop software* during any given session.

In addition, we highly recommend that the user account used to print be granted permission to the *group* owning the printer device on the computer. There are other methods to accomplish the necessary permissions, but M3D recommends the below:

Determine the owning group for the new device. The device generally appears as `/dev/ttyACM0`, or with a terminating digit greater than '0' if other serial-over-USB devices are already attached to the computer. The device can be found with the following command, looking for the device

whose original attachment time to the computer matches the date/time stamp on the device file:

```
> ls -lah /dev/ttyA*  
    (e.g. in a test we see /dev/ttyACM1 with an attachment date/time of Jun 16 18:24, and  
    an owning group of dialout)
```

Additionally, we can verify the current user:

```
> whoami  
    (e.g. output for the author of this document is matt)
```

Now we can add the current user to the group owning the device. Note the capital 'G' or this command will not execute as expected. Also, replace the section of the command in orange with values appropriate for your setup gathered from the commands above:

```
> sudo usermod -a -G dialout matt
```

Finally, **log out** of your Linux session and log back in for the group addition to take effect.

3. To enable unattended printing, we recommend that users set their computer and operating system power settings such that the computer does not enter suspend mode during long periods of inactivity. For example, on Ubuntu 16.04, under Power settings, one would choose "Don't suspend" for the "Suspend when inactive for" option.
4. Now we have completed environment prerequisites and are ready to use the printer with desktop software.

You should already have received a download link from M3D for the desktop software. From a terminal session opened to the working directory containing the completed software download,

move and install the software to the desired location. For evaluation purposes, we use the user's desktop (in orange below – replace these portions of the commands, if desired):

```
> mv M3D-Linux-1.5.0.70.tar.gz ~/Desktop/  
> cd ~/Desktop  
> tar -zxvf M3D-Linux-1.5.0.70.tar.gz
```

And to run the desktop software:

```
> mono ./M3D.App/M3DGUI 1>/dev/null 2>&1 &
```

(NOTE: this command can be simplified to `mono ./M3D.App/M3DGUI`, although the version above makes sure to return control to you within the terminal immediately, and not clutter your terminal output with diagnostic messages that may from time to time be output by the software. **Please also note** that in either case, if the terminal hosting the desktop software is closed, the desktop software itself will be expected to close as well. This will terminate any activities the printer was executing, including printing.)

We appreciate you joining in as our first group of Linux customers. As we seek to continually make our products better, please don't hesitate to provide us feedback or ask for support through any of the available channels. And if you are just getting started with a library of 3D models, zoom over to <http://www.thingiverse.com> for inspiration.

Happy printing!

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