My Phone printer  
Project Scope

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# Overview

## Project Background and Description

For those who are not aware, the ONO printer is a [Kickstarter](https://www.kickstarter.com/projects/olo3d/olo-the-first-ever-smartphone-3d-printer) project. Originally named the OLO, the device is designed to use a modern smartphone as the main electronics of a resin based 3D printer. It uses daylight curing resin, and the display of the phone to display sliced, black and white, images to cure the resin. It also uses the phone’s headphone jack to control the build platform. Signaling to the motor control electronics to move the platform.

The original Kickstarter project included the Windows mobile phone platform, but this has since changed as the project nears completion. Windows phone has now been left out, and the ONO software is reliant upon current versions of IOS and Android. It is also intricately linked to the ONO cloud software. The software takes an STL file and does the slicing on the ONO servers, before feeding the phone application the images to display. It also surmised that it calculates the volume of resin (in ml) required for the print.

This project intends to provide an Opensource solution to drive the ONO printer itself. The concept is to emulate the FDM (Fused Deposition Manufacturing) printer space, such as the Prusa. FDM printers allow for a separate slicer to do the work on the desktop, before feeding the printer with the code to produce the item. This project separates the display functionality from the slicer, giving freedom to the end user to use their software of choice.

## Project Scope

This project is intended to be initially limited to the ONO printer, but only because it is the only printer of its type to come to market. This will likely change in the future.

The project is to provide functionality to display a series of pre-sliced images on a mobile phone display and to provide output via the headphone jack of the phone to drive the ONO build platform.

## High-Level Requirements

The new system must include the following:

* Ability to display Scalable Vector Graphic (SVG) images on a mobile phone display
* Ability to alter the length of time each image is displayed. This is the effective curing time for the resin. This should be alterable dependent upon the resin used. This allows for third party, daylight curable, resins to be used in the ONO printer.
* Ability to drive an external build platform. This is basic control of the printer’s Z axis. Simply up and down. For the ONO this is done via the headphone jack of the phone. It should be noted that this should be written in such a way as to allow for use of a phone’s USB connector, or Bluetooth if required. This would allow the software to be used in homegrown printers where the user has built their own device from scratch.
* Ability to calibrate the Z-Axis to the phone. The software needs to be able to provide an initial distance between the phone screen and the build platform.
* Ability to have a timed start. For phones without a front facing camera
* Ability to detect darkness. The ONO requires an ordered assembly. The phone is placed into the bottom of the printer. The resin tank is then placed on top, and the tank filled with resin. Finally, the build platform, and motor housing, is placed on top; closing the printer and making it dark inside. Darkness detection would enable the software to detect when the printer is closed and ready to print. If the start image is already being displayed, the resin starts curing immediately, leading to “Thick” adhesion points on the build platform.
* Ability to open a zip file from the users slicing software
* Ability to open a folder filled with SVG images
* Ability to use the image filenames to control the order the images are displayed in
* Ability to disable the phone’s display system level lighting (notification bars, and navigation buttons) buttons, and use the entire/full screen. All other lights should be disabled, this includes any additional phone buttons. If this is not available then the user should be notified that the buttons should be covered during printing to block light from them.
* Ability to tell the ONO printer top display to show the print-end lights. Alternatively, to play a sound to signal the print has completed.

## Deliverables

A piece of software that, initially, can be side-loaded onto a target mobile phone. It should be submitted to all the relevant phone stores (Apple, Google and Microsoft) but be freely available from GITHUB so that it can be installed manually by the end user.

## Specific Exclusions from Scope

Initially the slicing of an STL file should be excluded. It may be that at a later date the software could accept an STL file directly, and do the slicing on the phone itself. Phone hardware is more than capable of doing this.

## High-Level Timeline/Schedule

Completion of the project is reliant upon the developers having ONO hardware to test. Specifically build platform control, as no-one outside of the ONO project itself knows how this works.