SurfacePhone Building Instructions
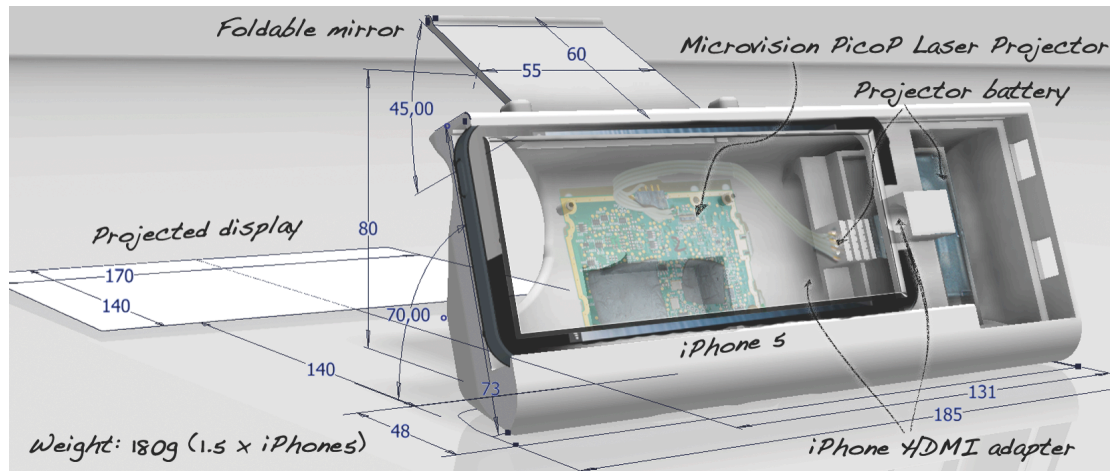

Needed Hardware:
- 3D printed case (if you don't have a 3D printer try e.g. http://www.shapeways.com/)
- 3D printed Mirror
- Microvision SHOWWX+ HDMI
- Mirror Foil (http://www.amazon.com/Mirror-Flexible-Silver-Adhesive-CRAFTING/dp/B004XBRPL4/ref=sr_1_1?ie=UTF8&qid=1379525460&sr=8-1&keywords=mirror+foil)
- Apple HDMI – Lighting Adapter (http://store.apple.com/us/product/MD826ZM/A/lightning-digital-av-adapter?fnode=3a)
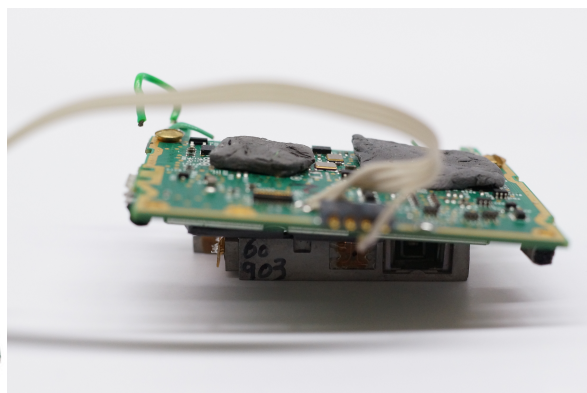- 20cm HDMI cable

1. The SurfacePhone print objects consist of the case and the mirror. Both files are included here and should be printed at a scale of 101% (bigger might be better) to account for printer insufficiencies.
2. Afterwards, the bottom of the mirror plastic should be covered with mirror foil, e.g.,
3. Then the mirror can be inserted with the curved part at the front in a curved motion into its slot. When a device is inserted, the device will prevent the mirror from sliding into the case when folded. That's for the plastic parts.

4. In the next step you need to tear down the PicoP Engine from a standard Microvision SHOWWX+ **HDMI**. The HDMI version is important as there is no direct connection cable between projector and iPhone 5 available as it used to be for iPhone 4 (which runs the software as well, but only at a framerate of 10 FPS). Alternatively, a non-HDMI version should work with Apple's Lightning-to-30pin adapter. The following video shows how to tear down the projector http://www.youtube.com/watch?v=6qun47AKFbk. When you are at the following stage:
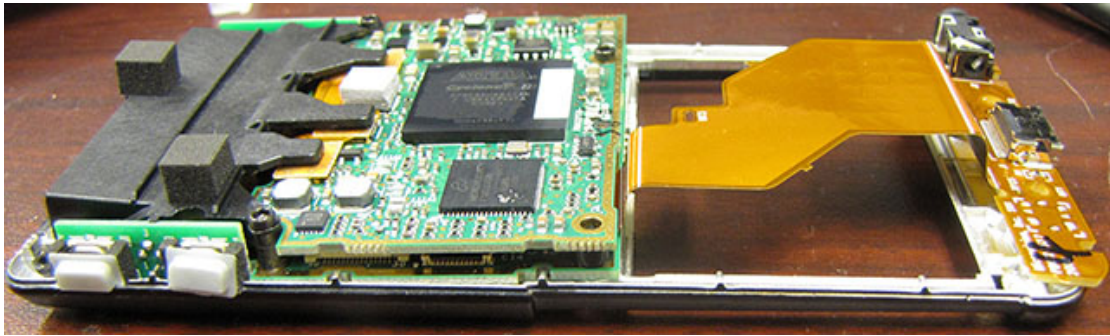
remove the flat cable on the right (we do not need that part), unscrew the rest of its board. Then you have to break the black plastic on the left apart to get to the underlying laser engine (don't worry, it is in its own cover and you cannot (easily) break or destroy it. After that you should have the following PCB with the projection module attached by a flat cable that allows it to be folded on its backside. Place the soft bumpers that came with the device between projector and PCB.
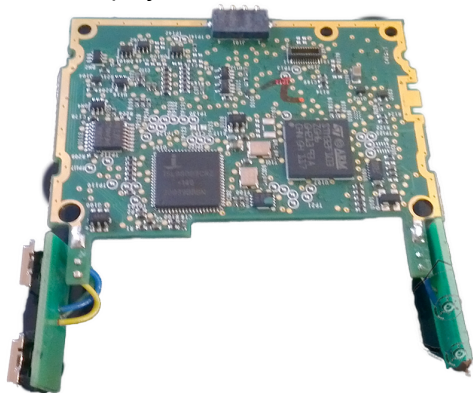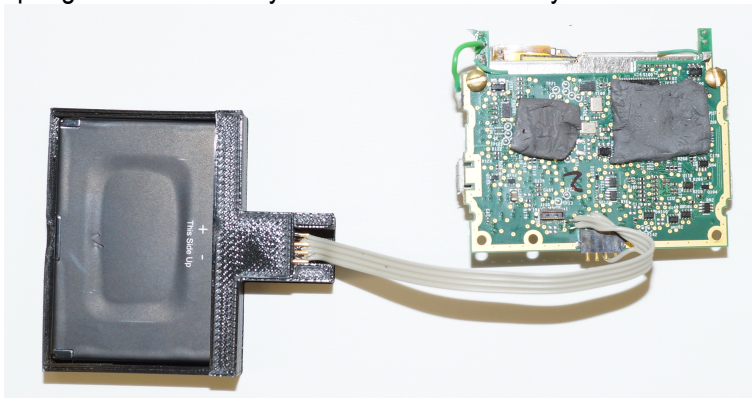

(top view as inserted into the case)   (side view)

5. Now you have to solder the power connection from the four pins at the top (left picture) to spring connectors firmly inserted into the battery-case.


6. Finally, you can screw the projector module into its place (try those that you have left over from the device during tear down). If you like you can affix the two button rows to the fitting holes on the bottom edge of the device with hot glue or similar.
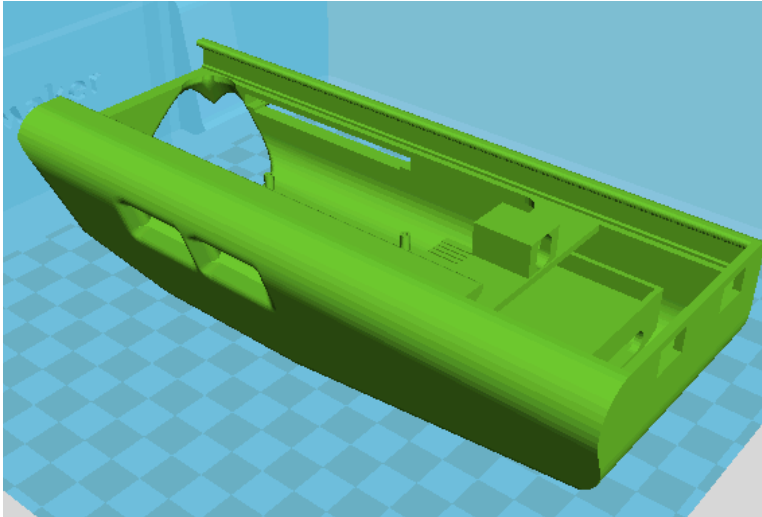
It also works fine to just leave the power cable and shortcut it to the ground-border around the PCB to switch the projector on or off (the disadvantage is that you always have to take out the phone to do so). The projector and battery-part should look similar to the following at the end.

7. The big part of the Apple HDMI adapter fits into the bottom on the following image, the Lightning connector part can be inserted into the top hole with a 90° twist back and forth.
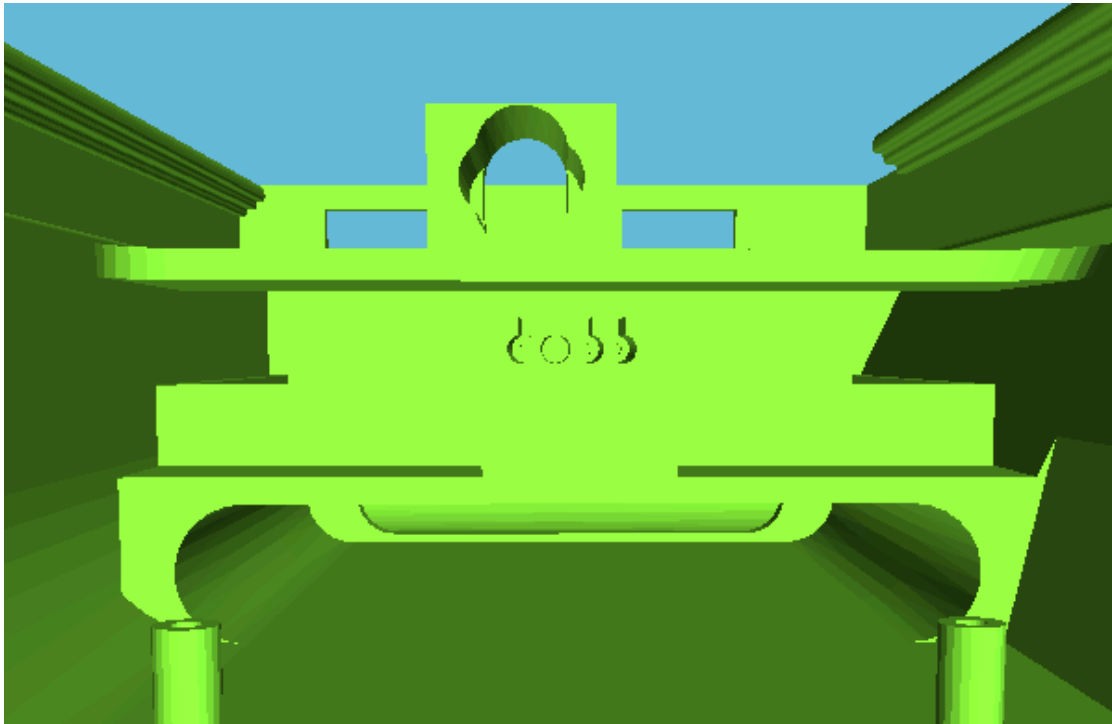
8. Now connect HDMI adapter and projector with an about 20cm long HDMI cable with small connectors and you're done with the hardware.
9. Now get an iPhone developer account (if you do not yet have one) and download and install the SurfacePhone software from the link provided below and you're all set.

   Have fun with the SufacePhone prototype.

Software: www.uulm.de/?SurfacePhone