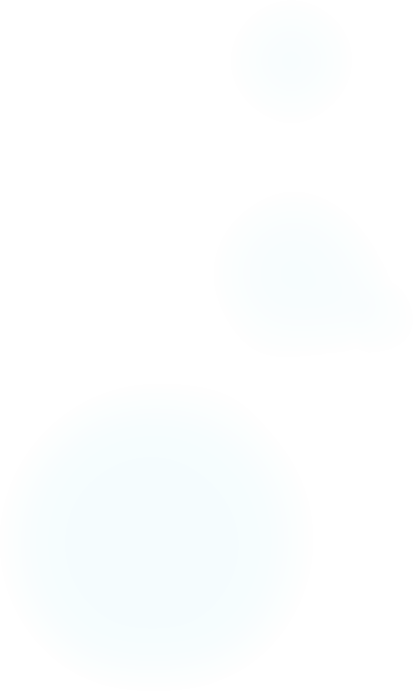
**Maker Guide**

**Hardware & Software**

**Mingle Disco Button**



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# Revision Notes

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| --- | --- | --- | --- |
| **Revision Number** | **Comments** | **Date** | **Author** |
| 1.0 | Doc Created | 11/03/15 | Kris Gibbs |
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|  |  |  |  |

# Circuit Board

The circuit board files was designed using Eagle Cad free version. You can use the .brd file in the GitHub repository or you can create your own. Either way the manufacturing procedure is the same.

## LID Tools Used

### LPKF Circuit Board Router

To route the board you will need 4 files from the GitHub repository.

* HexBoard.toplayer.ger
* HexBoard.bottomlayer.ger
* HexBoard.drills.xln
* HexBoard.boardoutline.ger

Put these on a thumb drive and put them into the computer that the LPKF is attached to.

Open up a browser and look up the LPKF SOP located here:

<https://github.com/psu-epl/psu-epl.github.com/wiki/Sop>

Follow the instructions carefully and choose the job type:

double\_sided\_GalvonicTHP

At this time, turn on the plating tank so it can be at the proper temperature when you are ready to use it. The switch is on the right hand side of the machine near the bottom.

I suggest making several copies. To do this, once your design is imported into

the software, right click on the design and click placement. Then fill in the field for how many copies you want. If you fill in the X field it will place the copies of the design in the X direction on the substrate. If you fill in the Y field it will place them in the Y direction.

The software will have the LPKF drill all the holes, vias, and fiducials and then it will stop and tell you to pull the substrate off and start the plating process.

Skip to the plating process section of this document and then return to this step.

After the plating is complete try to place the board back onto the base of the LPKF in nearly the same position as it was before. The LPKF will try to find the fiducials automatically…..it may be successful it may not. After it has tried several times it will ask you to find it manually. Use the arrow buttons on the screen in the top left to move the camera around until it finds the fiducial. If you need help you can use the circle with the arrows template that is actually for the A406 and is usually near that machine or on top of the drill bits. Once all the fiducials are found the LPKF will route the rest of the board. It starts will the bottom layer first, then it will ask you to flip it. When you flip it you will have to locate the fiducials again and then it will route the top of the board and cut out the board outlines.

This process is the most time consuming of the entire project. Routing the board and plating the holes takes approximately 4 hours total. You will need to be in the lab for the entire time.

### LPKF Plating Tank

Turn on the plating tank a few minutes before you actually want to start using it so it can be at the proper temperature when you are ready to use it. The switch is on the right hand side of the machine near the bottom.

Look up the SOP for the plating tank here:

<https://github.com/psu-epl/psu-epl.github.com/wiki/LPKF-MiniContac-RS-Plating-Tank>

Follow the instructions VERY CAREFULLY.

### Laser Cutter

### Reflow Oven

# Enclosure

## LID Tools Used

### 3-D Printer

### Laser Cutter

# Software

# Testing