

LPG INCINERATOR V2 PCB

Introduction:

This document consists of overall resources and the fabrication processor for the electronic system of the Incinerator V2 model.

It consists of :

1. PCB Design
2. Embedded firmware.

The process consists of the following:

1. PCB fabrication.
2. PCB component assembly.
3. Firmware flashing.

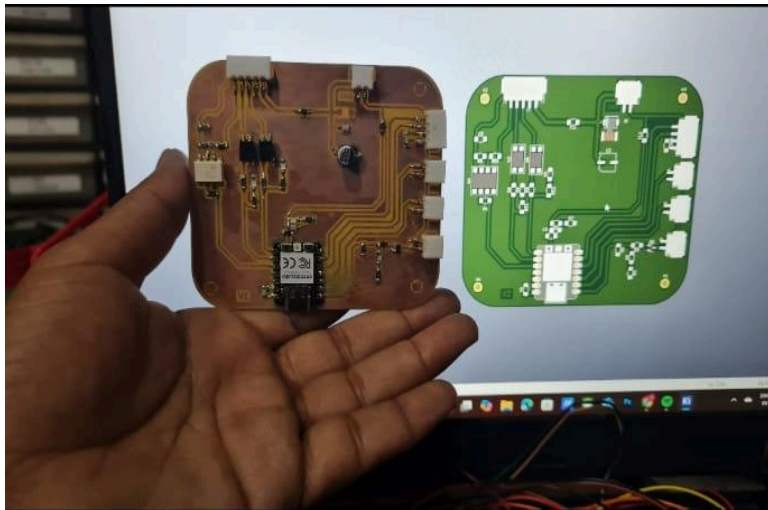
All Resources GitHub Link: <https://github.com/vrucando/LPG-Sanetory-Napkin-Incenerator>

A.PCB Fabrication:

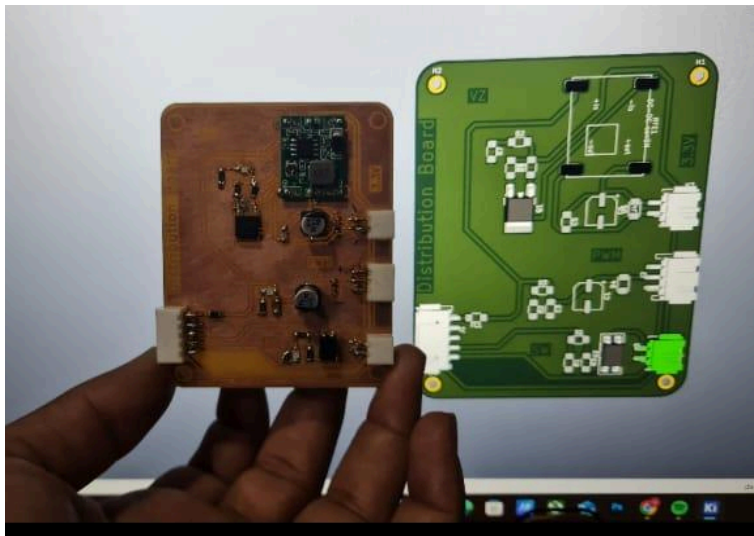
This system consists of 2 PCB units Controller board PCB & Distributor board PCB.

Both are designed in KiCAD

files: Zip>KiCAD board > Distribution board PCB, Control Board PCB.



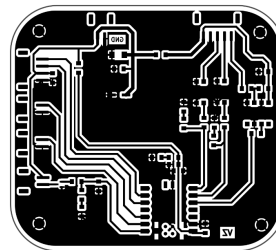
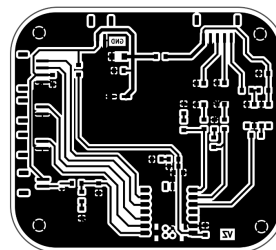
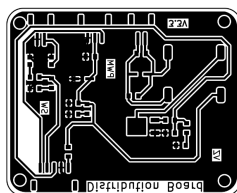
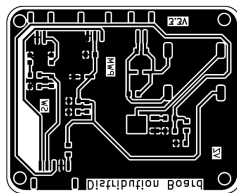
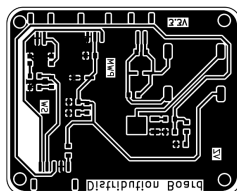
Control board



Distribution board

Step 1:

Print both PCB prints on A4 size Glossy Photo paper using a laser printer with optimum print Density.



Note: For printing on photo paper, set the ink density to maximum/high. The print must be on the glossy part of the photo paper.

Step 2:

Prepare the Copper Clad for PCB etching. I use an SRM-20 CNC milling machine to cut the copper clad into the PCB's desired shapes.



Follow this link for operating the SRM-20 machine:

<https://fabacademy.org/2024/labs/vigyanashram/students/prachi-shingane/Assignment-4.html>

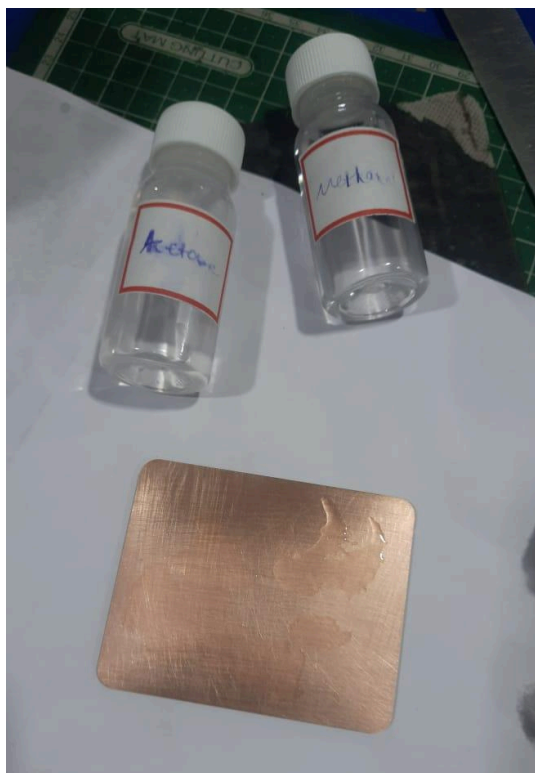
Resource

files: Zip>Eage cut> Distribution board PCB cut, Control Board PCB cut.

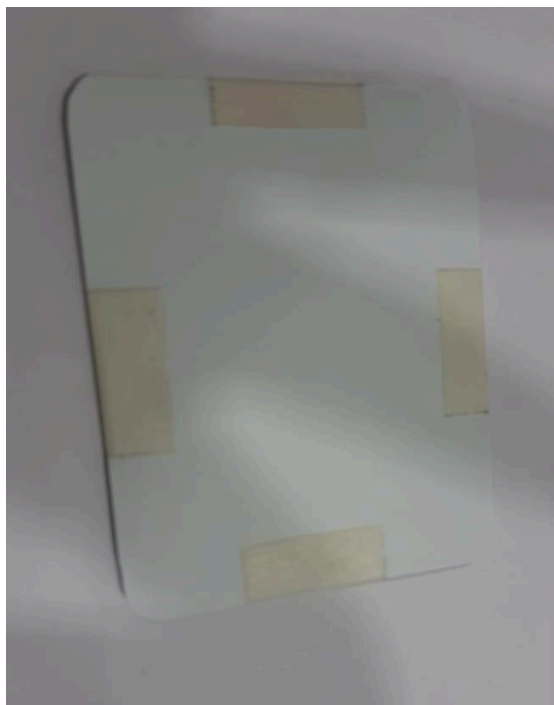
I use these PNC images to general (.rml) file and cut the PCB in desired shape.

Step 3:

Preparing the impression on Copper clad.



Before Preparing the impression make sure to clean the copper side of the desired PCB board using a scrub bar (green scrub is used to wash kitchen utensils) and use methanol and acetone to remove dirt and oil contained on the copper surface to make it shiny and clean.



To make an impression on copper clad make the glossy print side of the paper on the copper side of copper clad and make it uniformly heat and press using electric iron for min 5 Min After that make it cool down for at least 2 minutes and pill it down. make the shower the tresses of PCB on glossy paper imprint properly on the copper clad.



Note: press the paper uniformly until it sticks to the copper clade it turns blackish when pressed.

Step 4:

PCB etching process

There are 2 types of etching solutions I prepared for this PCB etching process.

1. FeCl_3 50% concentration for 100ml

Proportion:

50gm of FeCl_3 Dissolve in 100ml of distil water homogenous.

Time 10~15 min

2. $\text{HCl} + \text{H}_2\text{O}_2$ 80ml Solution.

Proportion:

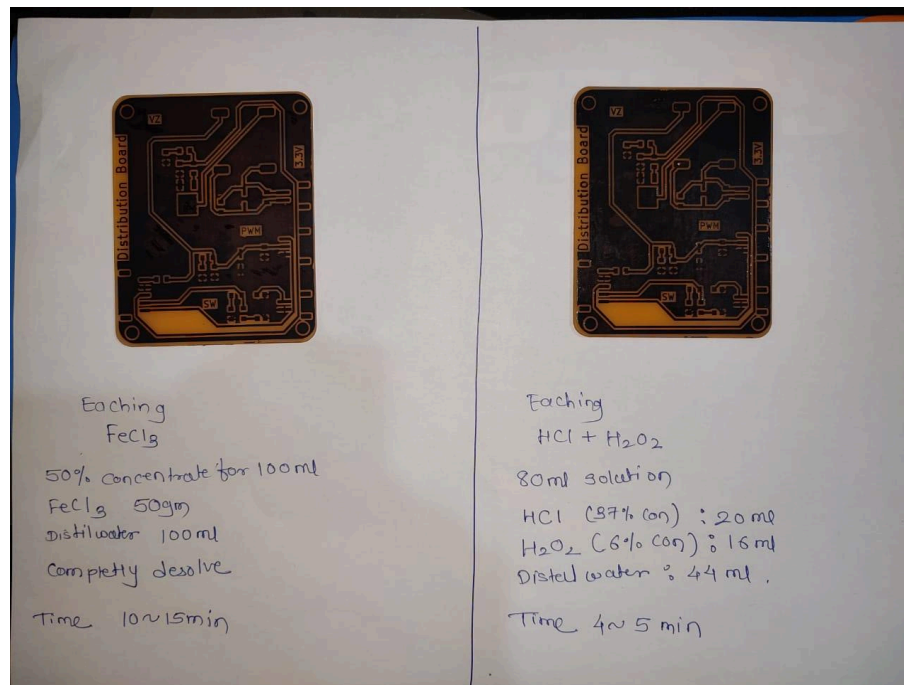
HCl (37% concentrated) :20ml

H_2O_2 (6% concentrated):16ml

Distal water:44ml

homogeneous mixture.

Time 4~5 min



Use an electro-mechanical orbital shaker to properly shake the PCB board in solution.



When Copper gets completely removed from the exposed area dip it in distilled water to remove any etching chemical from the surface.

Process video: <https://youtube.com/shorts/ehiWx7Gn14s?si=xjTI6FHMFeD8S-Tc>



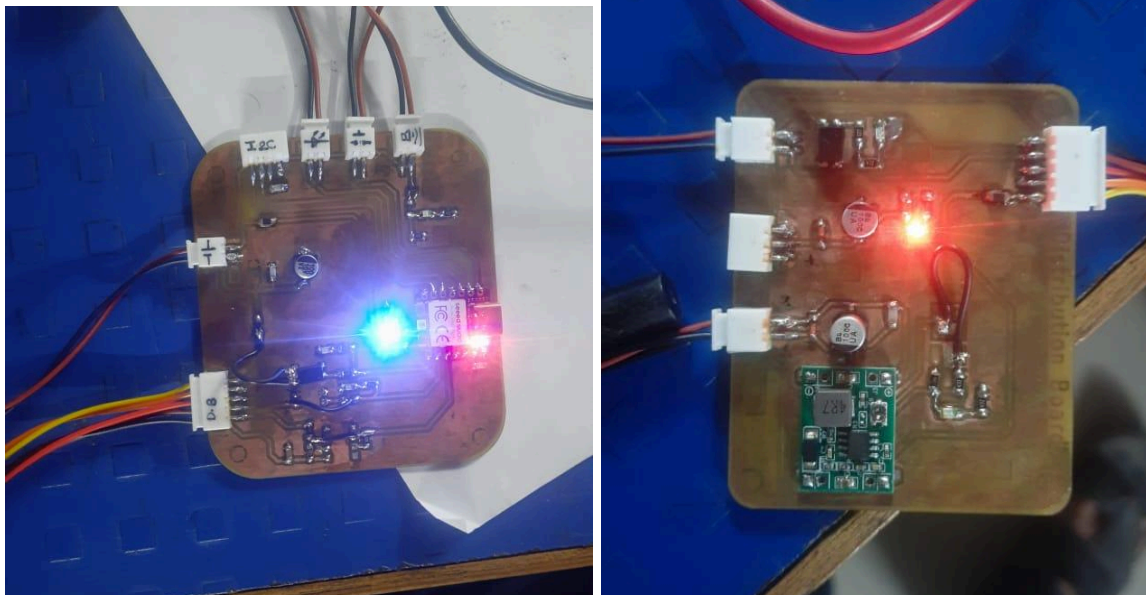
After that, use methanol or acetone to remove the ink on the PCB board's covered part using a cotton bud or simple cloth.

B.PCB component assembly.

List of required components:

BOM:

One Can use Scametic and KiCAD PCB files to know the position of the component and use a FabLab soldering Station to solder all components in there place.



Note: make sure the polarity of all components is in the right direction while soldering them on the PCB.

C.Firmware flashing.

Resource:

GitHub

link: https://github.com/vrucando/LPG-Sanatory-Napkin-Incinerator/blob/main/LPG_Incinerator_V2_Vigyan_Ashram/LPG_Incinerator_V2_Vigyan_Ashram.ino

I use Arduino IDE to flash this firmware to the Control board.

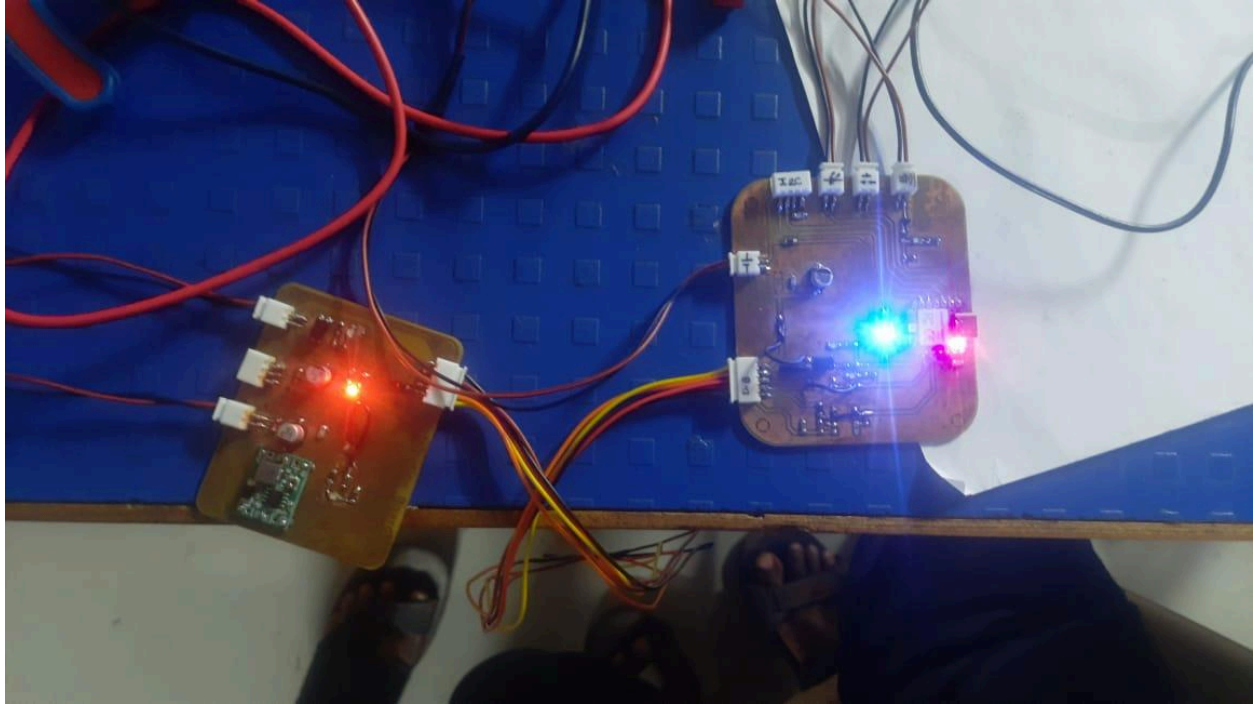
To install the XIAO RP2040 board in Arduino follow this resource.

link:

<https://wiki.seeedstudio.com/XIAO-RP2040/>

Follow this page to learn how to flash code on the Control board.

link: <https://fabacademy.org/2024/labs/vigyanashram/students/prachi-shingane/Assignment-6.html>



Note: please check the zip file I attached all necessary required resources in it if you find some of them are messing in the document.