BME 680 SENSOR DAUGHTER BOARD

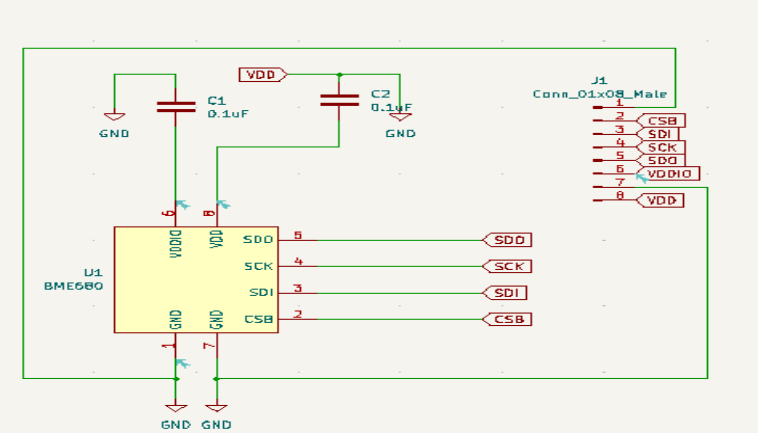
INTRODUCTION TO DESIGN

The design of the project was to create a sensor for a raspberry pi, microprocessor which contains different GPOI pins up to 40 of the pin the main pins that the user will mainly use is the I2C pin, SDA I2C, SCL I2C and the power pin of 3v3 which are the connected to the daughter board via female to female wire which the configures the communication, using a python code the BME can easily communicate with the raspberry pi zero w, the sensor is known as multisensory board since it can sense different environmental aspect like humidity, temperature and pressure.

DISCUSSION OF SCHEMATIC AND DESIGN CHOICE

Ki-Cad was used to model and simulate the design by identifying the requirements for the circuits which were BME680, Capacitors and Connector wire 2 attempts were made when schematic was under design firstly connections were made directly to the BME component which might lead to the fluctuation of temperature and high frequency disturbance resulting into incorrect configuration and resulting and failure which might damage the circuit the error checking was done using the ERC in ki-cad which provided error and warning from the schematic design.

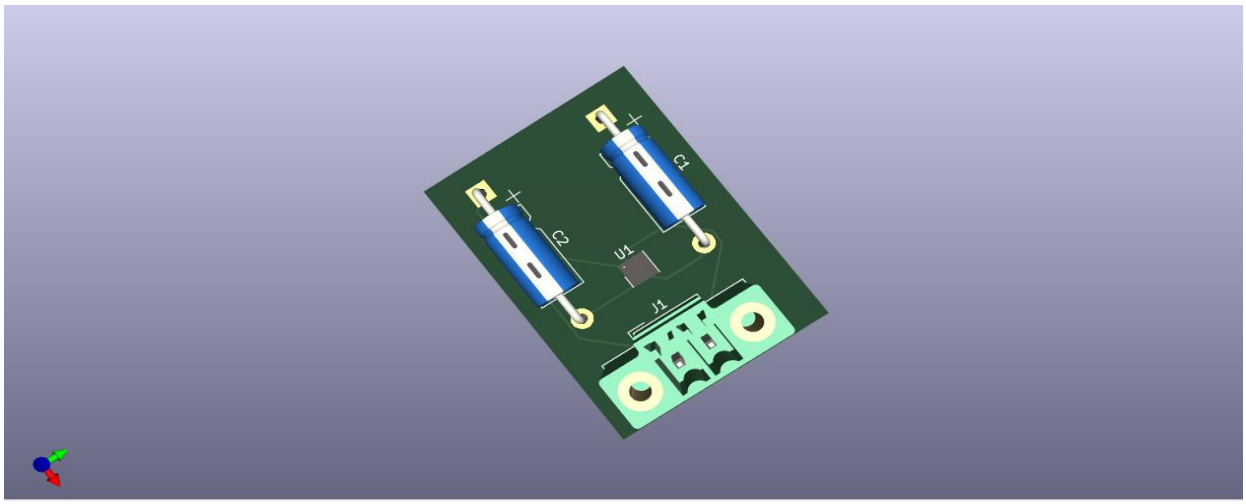
Second attempt was to compensate the connection through a connector that is placed parallel to the BME and configured the pins and 2 capacitors were then connected through the VDD and VDDIO to filter any unwanted noise from the environment the diagram below show the design and error checking.



DISCUSSION OF THE PCB AND DESIGN CHOICE MADE

Various design model were consider waterfall, spiral and agile but due the complexity of the design the best model that was considered was agile as it involves frequent error checking and changes of requirements and specification by producing different PCB design and testing the PCB required had to fall under a certain measurement which include the dimension of the board that is 25mm x 25mm which is a very good size for a daughter board

and weight of the board was also considered which meant restrictions were introduced through adding different layers in our PCBand not adding to many components that might lead to much power consumption.



DESIGN CONCLUSIONS

The design was a success due to meeting most of the design requirements and running sufficient testing for the BME board sensor this included two major test which were ERC and DRC for the board and extra testing was also done in LT-Spice simulation for extra verification purpose

REFERENCES

[1]

Contextual Electronics, “KiCad 3.0 - Generating Gerber Files For Manufacturing In KiCad,” *YouTube*. Jul. 31, 2014. Accessed: Jun. 03, 2022. [YouTube Video]. Available: https://www.youtube.com/watch?v=4PnY2IUQ2Tg

[2]

“capacitor tht vs smd - Google Search,” *Google.com*, 2017. https://www.google.com/search?q=capacitor+tht+vs+smd&source=lmns&bih=656&biw=1536&hl=en&sa=X&ved=2ahUKEwiPjImekJH4AhULohoKHbQpB-oQ_AUoAHoECAEQAA (accessed Jun. 03, 2022).