GUI and Zigbee Based Intelligently Decision Making Shortest Path Robot

Project Advisor

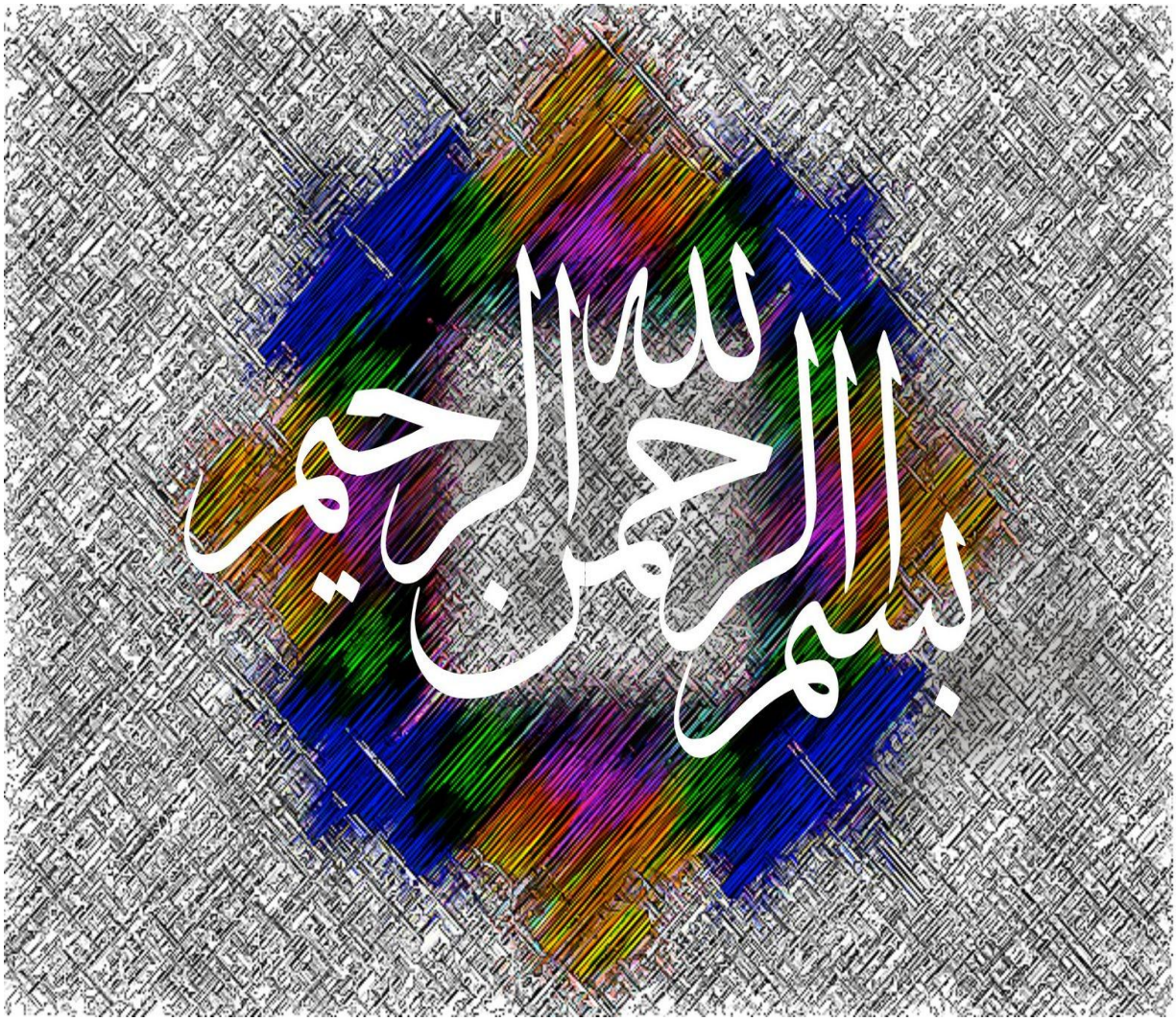
Sir Farhan Iqbal

Submited by

Muhammad Faheem Aslam	091420-291
Hafiz Wajid Aziz	091420-287
Hafiz Muhammad Usman	091420-269

School of Science & Technology

University of Management & Technology


بسم الله الرحمن الرحيم

Project Report submitted to the

Department of Electrical Engineering, University of Management and Technology

in partial fulfillment of the requirements for the degree of

Bachelor of Science

in

Electrical Engineering

Advisor Name: -Mr. Farhan Iqbal

Advisor Signature: - _____

Team Members: -

Hafiz Wajid Aziz	091420287
M Faheem Aslam	091420291
Hafiz M Usman	091420269

Abstract

Design a Graphical User Interface based controlled robot which covers the shortest distance from given source to its destination with the help of color sensors and continuous communication through Zigbee Transceiver. The initial and final points are in the form of different nodes on a chip board to which color sensors are attached on every node for giving signal back to us on computer about robot's recent holding position. Robot takes the input from GUI on computer and move itself to given position with the help of continuous communication between GUI input and sensors by detecting, sensing and passing through different positions. Robot gets input signal and before moving towards the given position it intelligently took decision for the very short path by following Dijkstra's algorithm and then moves towards its given position. This technology is very useful in navigation systems and in hazardous conditions.

DEDICATION

First of all we are very thankful to **ALLAH ALMIGHTY** who has given us enough courage to complete this project.

Dedicated to

Our loving Parents

&

Mr. Farhan Iqbal

Who enlightened our minds with Knowledge, tried

to include the spirit of hard work and dedicational us

So that we could have a BRIGHT FUTURE in terms of being

Good human and turn out competent Engineers with competency

to take the challenges of ENGINEERING PROBLEMS.

ACKNOWLEDGEMENTS

Thanks to Allah Almighty, who, with His willing, give us the opportunity to complete this Final Year Project which is title GUI and Zigbee Based Intelligently Decision Making Shortest Path Robot? This final year project report was prepared under School of Engineering, University of Management and Technology (UMT).This project is a culmination of a long period of work and without the support of many individuals; it would never have been existed. First and foremost, we thank our families, for their care and endless support to complete this project.

We have set a light and ever burning flame of gratitude and deep sense of obligation to our honorable advisor Mr. Farhan Iqbal for his generous assistance and inspiring attitude during the course of our project. Not only he helped us in our project but also did his best efforts in familiarizing us with basic concepts of components used which proved to be very helpful while doing our project. We would feel great pleasure in thanking Mr. Rauf Ali for their extreme co-operation and encouraging during this project.

Our thanks also to Mr. Saleem Ata head of undergraduates affairs, Mr. Asim Butt for offering us insightful thoughts and guidance. Asif Hussain who supported us both morally as well as giving us the advises to complete our project. Not forget, great appreciation go to the rest of the labs staff that help me from time to time during the project.

Chapter IVSerial Communication

Chapter VIDesign and Simulation

Appendix

List of figures

List of Tables

Introduction

A robot is a mechanical device that can perform tasks automatically. Some robots require some degree of guidance, which may be done using a remote control, or with a computer interface. A robot is usually an electro-mechanical machine that is guided by a program or circuitry. So we used here computer interface through GUI. Also our robot is working on Zigbee Transceivers through continuous communication between robotic circuit and static circuit attached to the input by GUI

History of Robots

The robots and robot-like automates can be traced back to medieval times. Although people of that era didn't have a term to describe what we would eventually call a robot they were nevertheless imagining mechanisms that could perform human-like tasks. In medieval times, automatons, human-like figures run by hidden mechanisms, were used to impress peasant worshippers in church into believing in a higher power. The automatons, like the clock jack pictured here, created the illusion of self-motion.The clock jack was a mechanical figure that could strike time on a bell with its axe. This technology was virtually unheard of in last four decades.

Shortest Path Detection

How it checks shortest path?

This design basically works with the help of GUI and Zigbee continuous communication. Also on every color node Zigbee give signal back to GUI about the robot present position and also update it on GUI map on computer. Now, robot checks the all distances from different nodes and by using Dijkstra's Algorithm it starts moving towards its destination node. In this way robot moves on the shortest path.

Basic Idea

Our project is basically about the new technology invention of a robotic system which can travel through different nodes by using shortest path. Basically we used wireless communication in our robot for its operating purpose. It is very useful in developing new technology and in many industry applications

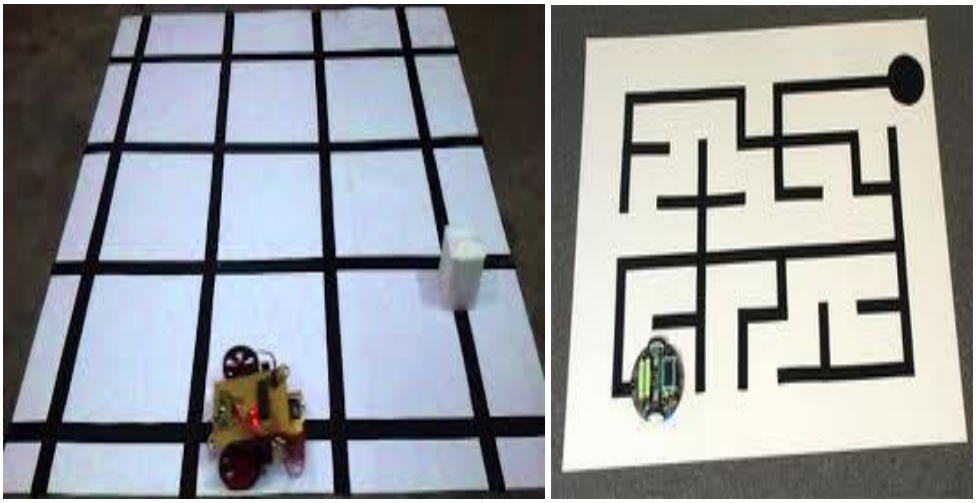


Fig 1.6 Basic Idea

1.5:About Project

- Design GUI, using visual studio 2010, for giving input command from specific source node to specific destination node.
- GUI communicates with the help of serial port and level converter RS232 to the PIC microcontroller in Static circuit.
- Zigbee transceiver also interface with PIC microcontroller in static circuit which is use to transmit or receive data from robot dynamic circuit and GUI map will update the robot current position.
- At the robot end of dynamic circuit, Color sensor module is interface with PIC microcontroller to detect the specific node that is colorful with different colors.
- Use Dijkstra's algorithm for approaching shortest path.
- DC motors with gear box is use to increase the torque and decreases the speed of motor because of the tackle of battery load.
- Also dc motors is combines with absolute rotary encoders to generate the digital signals in response to motion and provide motion control system with information of concerning position, velocity and direction.
- Dc motors are interfaces to PIC microcontroller in dynamic circuit with the help of L298 motor driver, also Zigbee transceiver is interface with PIC microcontroller in dynamic circuit of robot structure for static circuit and dynamic circuit full duplex communication.
- CCS C complier is utilizing for programming purpose.

1.6: Our Aim

Our project's aim is to design an easy to use and low cost shortest path Robotic car that will save time. For this purpose we use stepper motors and transceivers. Transceivers are used for continuous communication between GUI and moving Robot so that we can use it for different applications in saving our time.

1.7 Basic Differences

As we have taken idea for this Project from internet new technologies but we made the modifications in that project as they used

1- Color Sensor Module
2- Stepper Motors
3- Micro-Controller PIC16f877A
4- Oscillator (Crystal) 40MHz
5- L297 Motor Driver
6- Transformer
7- Serial Cable / Port
8- DB9 Connector
9- Full Wave Rectifier
10- Level Converter MAX232.
11- Connector
12- Voltage Regulator.
13- Zigbee Transceiver
14- Capacitors
15- Resistors
16- Diode
17- LED

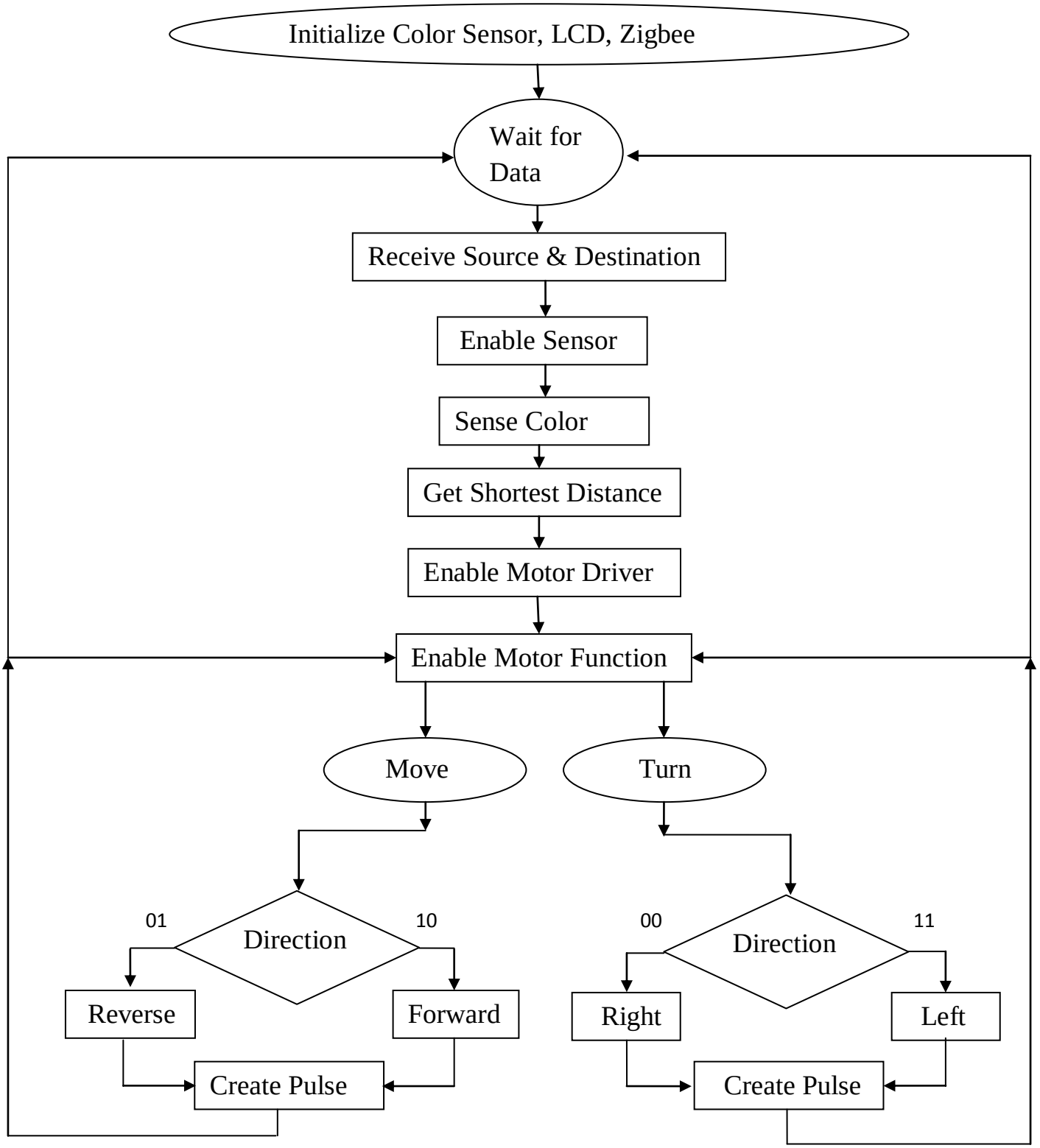
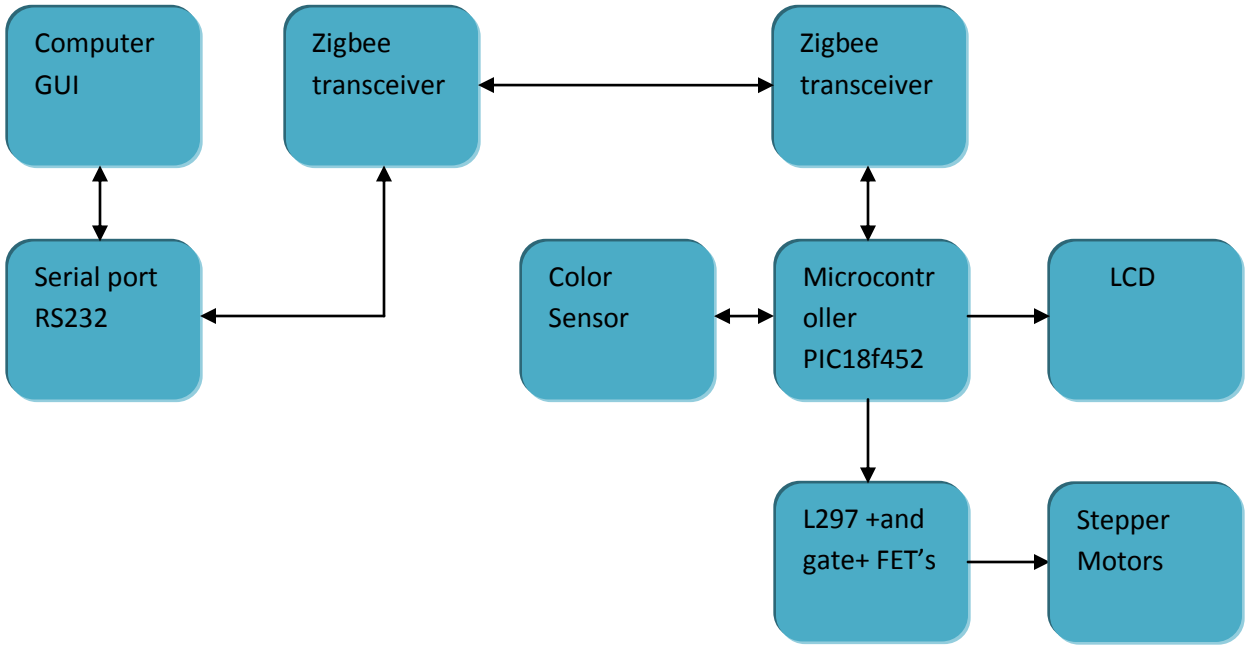
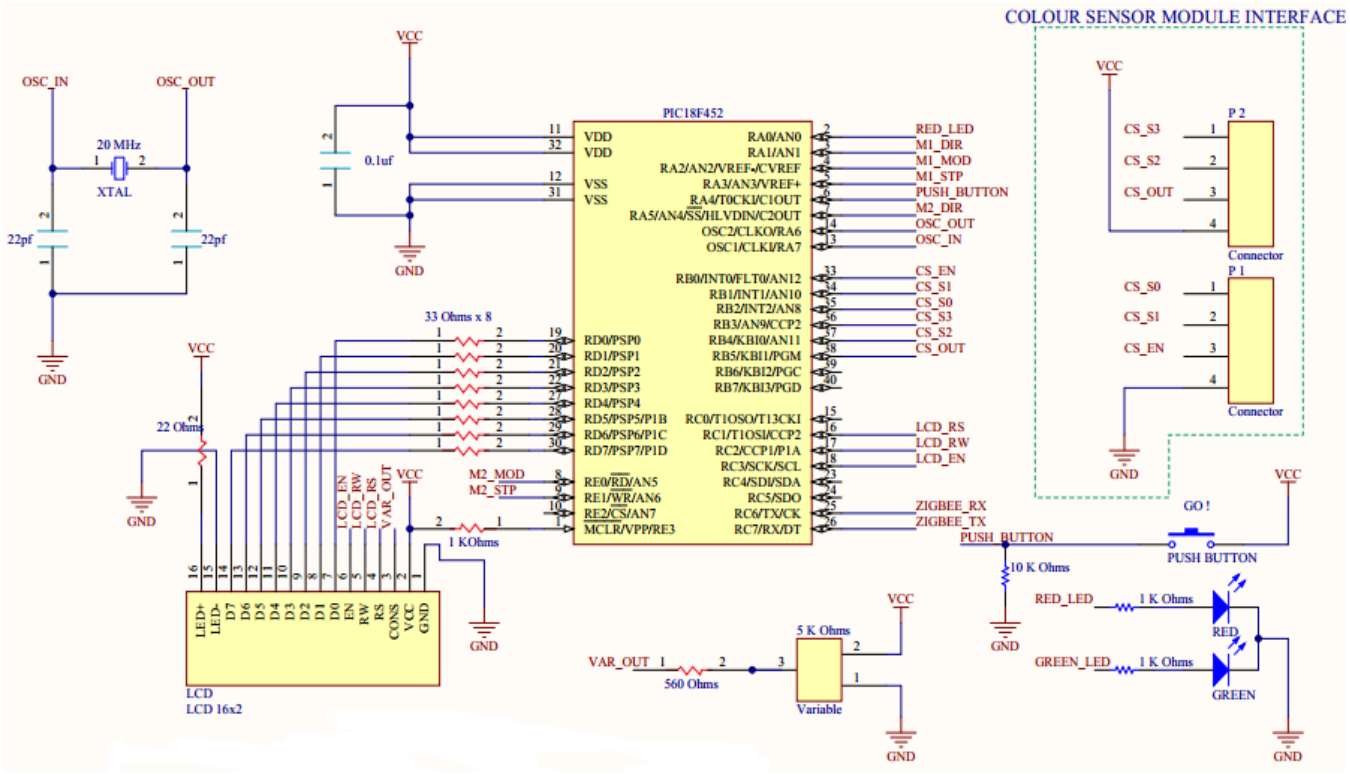


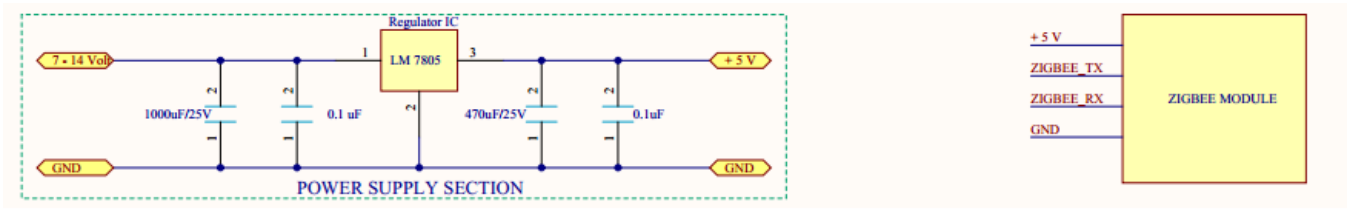
Fig 2.1 Flow chart

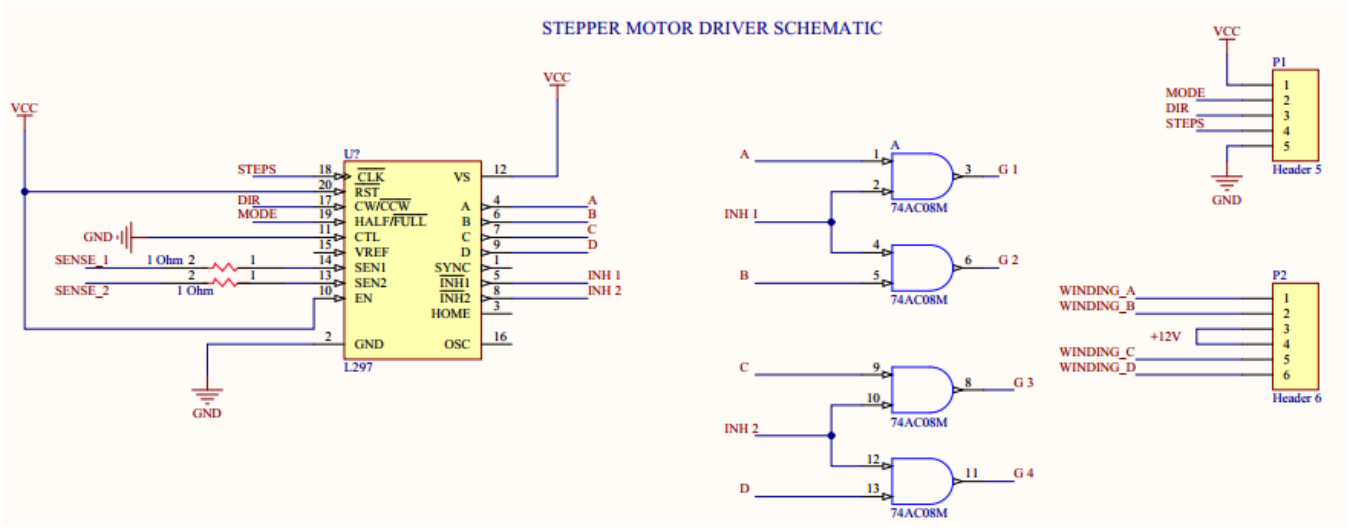
Block Diagram

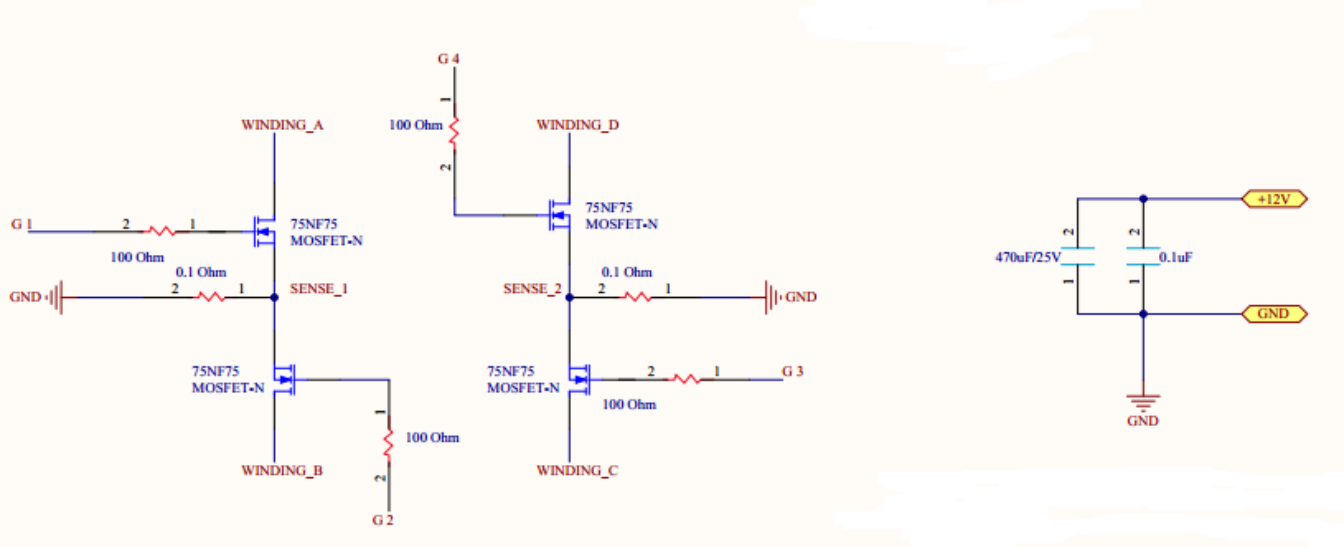


Circuit Diagram








G 4
WINDING_A
100 Ohm
WINDING_D
G 1
75NF75
MOSFET-N
100 Ohm
0.1 Ohm
GND
SENSE_1
SENSE_2
GND
75NF75
MOSFET-N
75NF75
MOSFET-N
G 3
100 Ohm
100 Ohm
WINDING_B
WINDING_C
G 2
+12V
470uF/25V
0.1uF
GND
GND