Unipolar Automation Technologies

R&D Recruitment

20/2 West Panthapath, Dhanmondi, Dhaka-1205
www.unipolar.com.bd

R&D Recruitment is divided into two categories:

1. Firmware Development
2. Schematic and PCB Development

Submission Deadline: 27 May 2023, Saturday
Submit at: faisal.cuet14@gmail.com

** One applicant can submit his/her work progress one time only. There is no boundary or point for earlier submission.

Task List:

Firmware Development:

1. Controlling dc motor speed using PWM and motor driver.
    - 1. PWM value must be given from an LCD display using a keypad.
    - 2. Not more than 3 switches can be used.

2. Restaurant ordering system
    - 1. LCD menu will be created
    - 2. One will order foods using keypad

3. RTC clock management
    - 1. A light will be turned on/off at defined time period

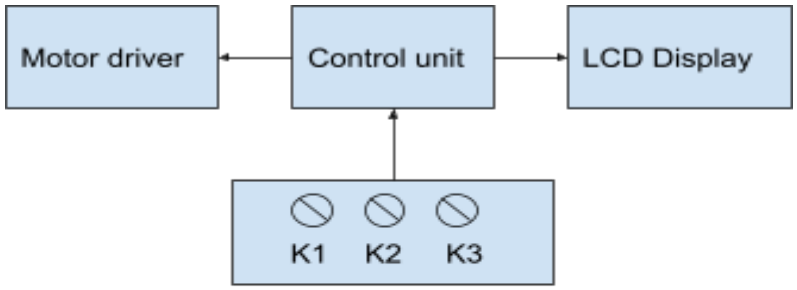
Schematic and PCB Development:

1. A dual channel H bridge motor driver for controlling a dc motor using MOSFET and gate driver

2. A wall clock using microcontroller and RTC

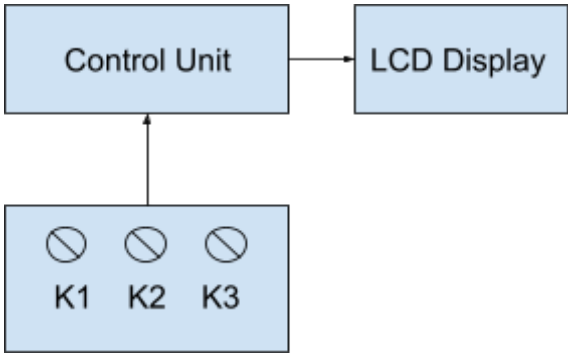
Section A: Firmware

Task 1



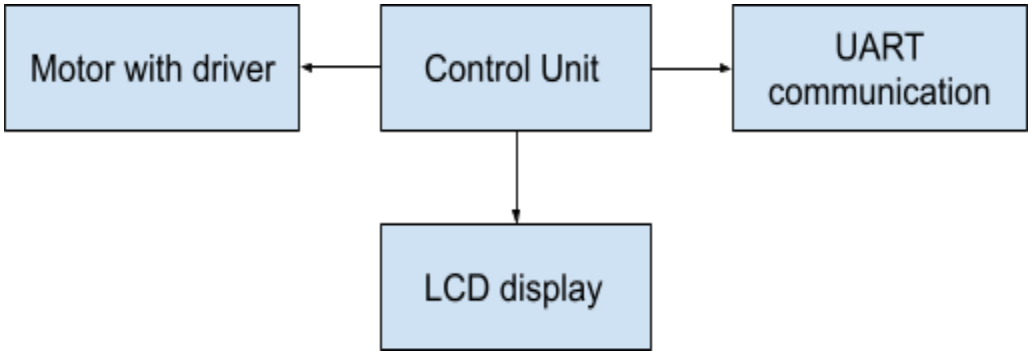
- K1 is interrupt driven
- Press K1 > LCD goes in input mode
- K2 > decrement PWM by 10 steps
- K3 > Increment PWM by 10 steps
- Press K1 again > LCD will show current PWM
- Control unit drive motor with set PWM
- Setting PWM less than 20, will ‘Turn off ’ the motor
- PWM value is 8 bit can be set from 0-255
- The LCD Library needs to be built on its own. No predefined Library can be used

Task 2



- K1 is interrupt driven
- Press K1 > to enter ordering mode
- Press K2 > to select menu and food
- Press K3 > to select item
- Long press K3 > for more than 2sec will register the items and ask for confirmation
- Select ‘Yes’ or ‘No’ to confirm or cancel order using K3
- Anytime pressing K1 > will reset the order and starts a new order
- Orders are stored in memory and can be requested by UART (No needed to be stored permanently)
- LCD Library can be used

Task 3



- No RTC is needed actually (Simulate RTC)
- User will get current time and date using UART
- Light ON and OFF time will be given by UART
- Time and motor status will be logged in LCD commands

Date : DD-MM-YYYY
Time : HH : MM (24 hours format)
ON : HH : MM
OFF : HH : MM

Section B: Schematic & PCB

Task 1

- Implement fly-wheel diode for back EMF protection
- Implement gate driver to drive MOSFET
- Motor should rotate in both forward and backward direction
- PWM control Input
- No H Bridge IC can be used
- Power Input should be at least 5V-20V (can extend the range)

Task 2

- Use RTC (any preferred)
- Use a Microcontroller (any)
- Use EEPROM memory (external, cannot be used MCU internal EEPROM)
- Powered by 5V/3.3V
- a 4 digit 7-segment display (AM/PM is not mandatory, one can implement it if wants. Otherwise 24 hours format is sufficient)
- Add there Push-button to change time
- 7-segment display driver is not necessary (one can use it if wants)

HH : MM (7-segment clock display)