

Fr. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING (FrCRCE)
Department of Electronics and Computer Science (ECS)

4. DC motor Interfacing

Course, Subject & Experiment Details

Academic year	2021 – 2022	Estimated Time	02 Hours
Course	T.E. (ECS)	Subject Name	Embedded systems and RTOS
Semester	VI	Chapter Title	Motor interfacing
Experiment Type	Coding	Subject Code	ECC 601

Aim & Objective of Experiment

To drive a DC Motor and control its direction and speed.

Theory:

DC Motor ideally needs a constant voltage to rotate. Thus, to achieve speed control, signal conditioning is necessary. To generate a variable dc voltage using microcontroller either DAC is used or in some advanced application PWM is used. In PWM, control average DC voltage is varied by varying the ratio of ON time to OFF time.

$$V_{DC} \propto T_{on} / T_{on} + T_{off}$$

With the help of relays or some specially designed chips we can change the direction of the motor rotation.

H- Bridge control can be created using relays, transistors, or a single IC solution such as the L293. When using relays and transistors, you must ensure those invalid configurations do not occur. Be aware that the L293 will be generating heat during operation. For sustained operation of the motor, use a heat sink.



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Algorithm:

```
#include <reg51.h>

sbit sw = P3^7;

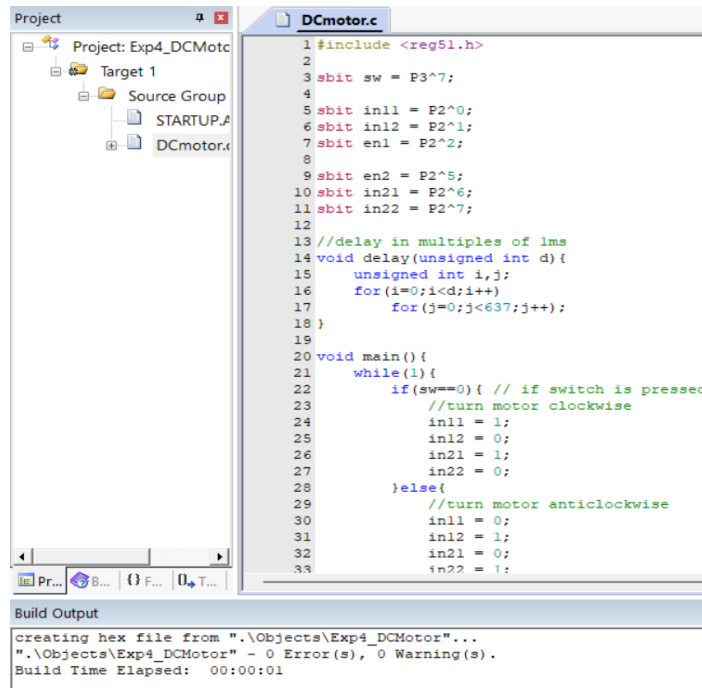
sbit in11 = P2^0;
sbit in12 = P2^1;
sbit en1 = P2^2;

sbit en2 = P2^5;
sbit in21 = P2^6;
sbit in22 = P2^7;

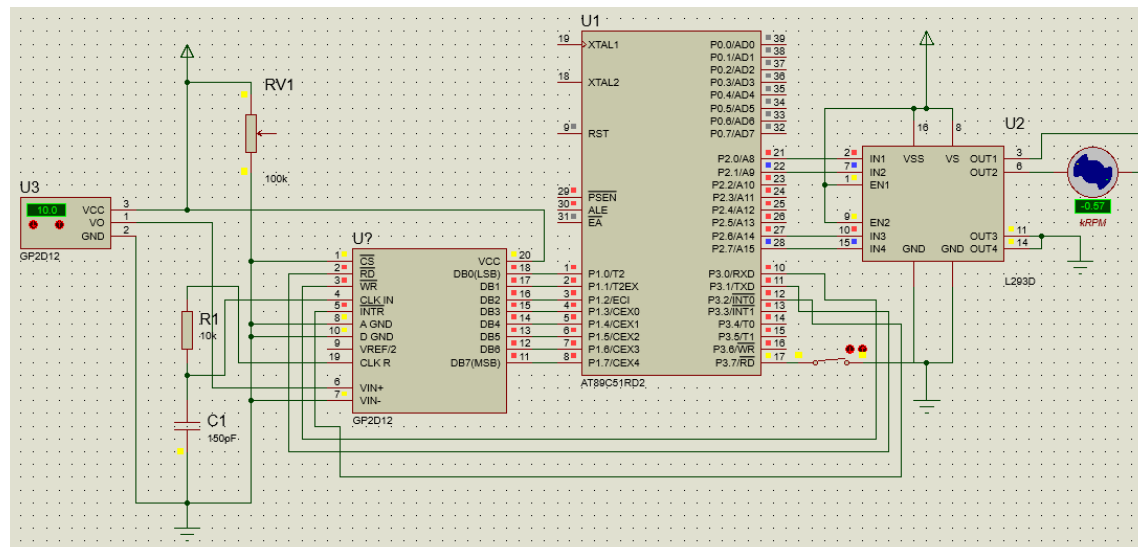
//delay in multiples of 1ms
void delay(unsigned int d){
    unsigned int i,j;
    for(i=0;i<d;i++){
        for(j=0;j<637;j++);
    }
}

void main(){
    while(1){
        if(sw==0){ // if switch is pressed
            //turn motor clockwise
            in11 = 1;
            in12 = 0;
            in21 = 1;
            in22 = 0;
        }else{
            //turn motor anticlockwise
            in11 = 0;
            in12 = 1;
            in21 = 0;
            in22 = 1;
        }
        //PWM given at enable pins
        en1 = 1;
        en2 = 1;
        delay(10); //on for 10ms
        en1 = 0;
        en2 = 0;
        delay(5); //off for 5ms
    }
}
```

Running the above code in Keil



Output of the code on hardware



Post- Lab Question

1. Give sample specifications/ratings of any DC motor
2. Explain PWM control of DC motor