// PROJECT  :DCMotorControlwith5VRelay

// PURPOSE  :DC Hobby Motor (Sparkfun's ROB-11696) with 5V Relay under control of 328P

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// DATE     :Confirmed. 2024 05 03.

// uC       :328p (Nano)

// STATUS   :Working

// MOTOR    :(3-12V) https://www.sparkfun.com/products/11696

// RELAY    :https://www.amazon.ca/dp/B0874MC6D3?ref=ppx\_yo2ov\_dt\_b\_product\_details&th=1

// PHOTO    :

// NOTES    :Demonstrates Forward, Reverse, and Coasting (Relay Power OFF)

#define OUTPUTSPEEDPIN  3         //PWM to MOSFET

#define RELAYCOIL       7         //2N3904 BJT controls direction (NC or NO)

#define DIRECTIONVCC    9         //Slide Switch (as stick shift)

#define DIRECTIONPIN    10        //1: Forward; 0: Reverse

#define DIRECTIONGND    11        //

#define INPUTSPEEDGND   A0        //potentiometer (as accelerator)

#define INPUTSPEEDPIN   A1        //potentiometer

#define INPUTSPEEDVCC   A2        //potentiometer

#define MOTORSPEEDMAX   255

#define MOTOROFF        0

#define DURATION        3000

uint8\_t motorSpeed;

uint8\_t direction;                //hold the active preference for motor rotation

void setup() {

  Serial.begin(9600);

  while (!Serial);

  pinMode(OUTPUTSPEEDPIN, OUTPUT);

  analogWrite(OUTPUTSPEEDPIN, MOTOROFF); // aka. digitalWrite(OUTPUTSPEEDPIN,LOW);

  pinMode(RELAYCOIL, OUTPUT);

  digitalWrite(RELAYCOIL, HIGH);



  pinMode(DIRECTIONVCC, OUTPUT);

  pinMode(DIRECTIONGND, OUTPUT);

  digitalWrite(DIRECTIONVCC, HIGH);

  digitalWrite(DIRECTIONGND, LOW);

  pinMode(INPUTSPEEDGND, OUTPUT);

  pinMode(INPUTSPEEDVCC, OUTPUT);

  digitalWrite(INPUTSPEEDGND, LOW);

  digitalWrite(INPUTSPEEDVCC, HIGH);

}

void loop() {

    direction = digitalRead(DIRECTIONPIN);

    digitalWrite(RELAYCOIL, direction);

    motorSpeed = analogRead(INPUTSPEEDPIN) >> 2;

    Serial.print(direction ? "Forward:\t" : "Reverse:\t");

    Serial.println(motorSpeed);

    analogWrite(OUTPUTSPEEDPIN, motorSpeed);   //convert [0,1023]->[0,255]->[0,5V]

}