Lesson 21 Relay

Introduction

In this lesson, you will learn how to use a relay.

Hardware Required

- ✓ 1 * RexQualis UNO R3
- ✓ 1 * Breadboard
- ✓ 1 * Breadboard Power Supply Module
- ✓ 1 * Fan blade and 3-6v dc motor
- ✓ 1 * L293D IC
- ✓ 1 * 5v Relay
- ✓ 1 * 9V 1A Adapter
- ✓ 8 * M-M Jumper Wire

Principle

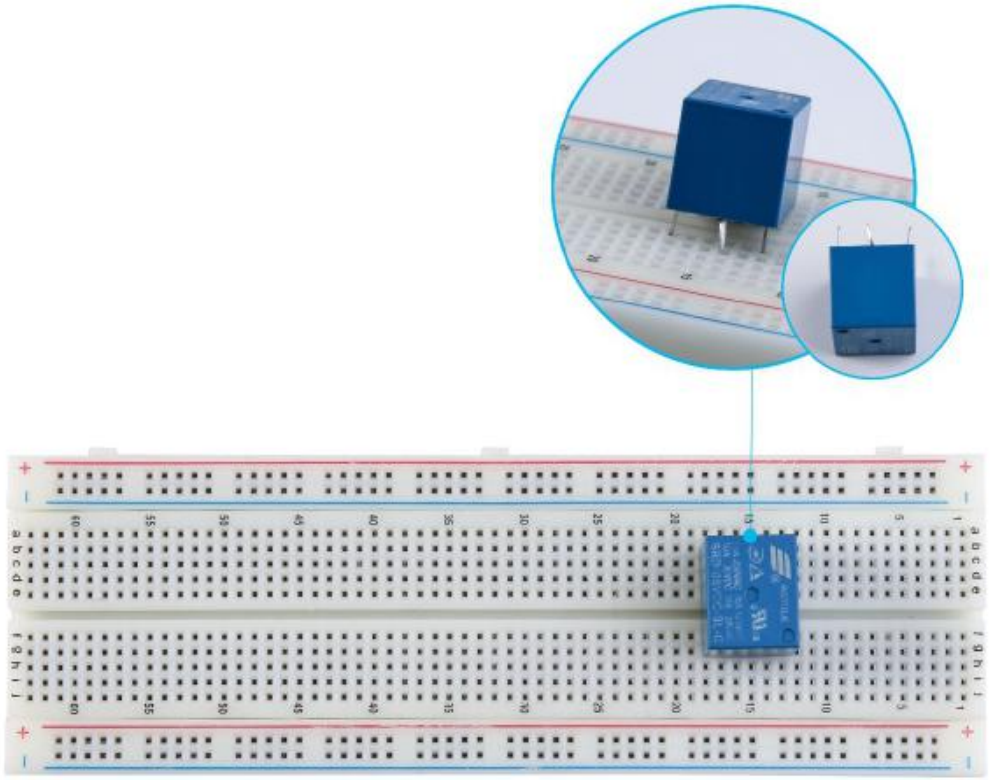
Relay

Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized. When a relay contact is Normally Closed (NC), there is a closed contact when the relay is not energized. In either case, applying electrical current to the contacts will change their state.

Relays are generally used to switch smaller currents in a control circuit and do not usually control power consuming devices except for small motors and

Solenoids that draw low amps. Nonetheless, relays can "control" larger voltages and amperes by having an amplifying effect because a small voltage applied to a relays coil can result in a large voltage being switched by the contacts.

Protective relays can prevent equipment damage by detecting electrical abnormalities, including overcurrent, undercurrent, overloads and reverse currents. In addition, relays are also widely used to switch starting coils, heating elements, pilot lights and audible alarms.



Code interpretation

#define E1 5 // Enable Pin for motor

#define I1 3 // Control pin 1 for motor

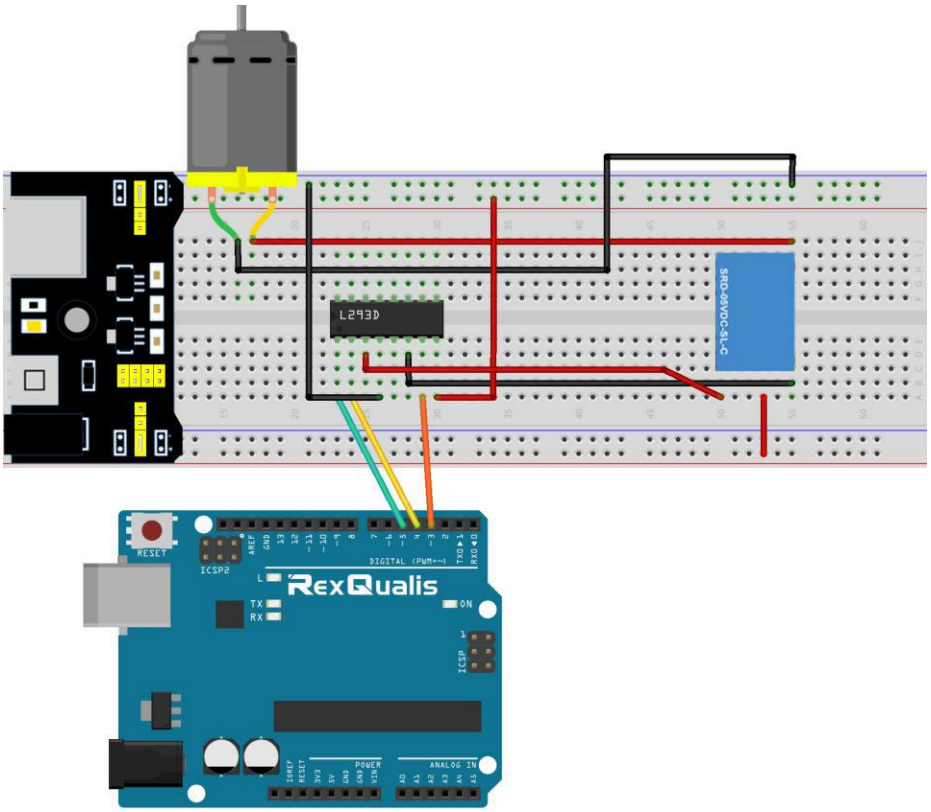
#define I2 4 // Control pin 2 for motor

```
int i;
void setup() {
   //---set pin direction
   pinMode(E1,OUTPUT);
   pinMode(I1,OUTPUT);
   pinMode(I2,OUTPUT);
   Serial.begin(9600);
}
void loop() {
//---back and forth example
      Serial.println("One way, then reverse");
      digitalWrite(E1,HIGH); // enable on
      for (i=0;i<5;i++) {
      digitalWrite(I1,HIGH); //one way
      digitalWrite(I2,LOW);
      delay(1000);
      digitalWrite(I1,LOW); //reverse
      digitalWrite(I2,HIGH);
      delay(1000);
   }
   digitalWrite(E1,LOW); // disable
      delay(3000);
```

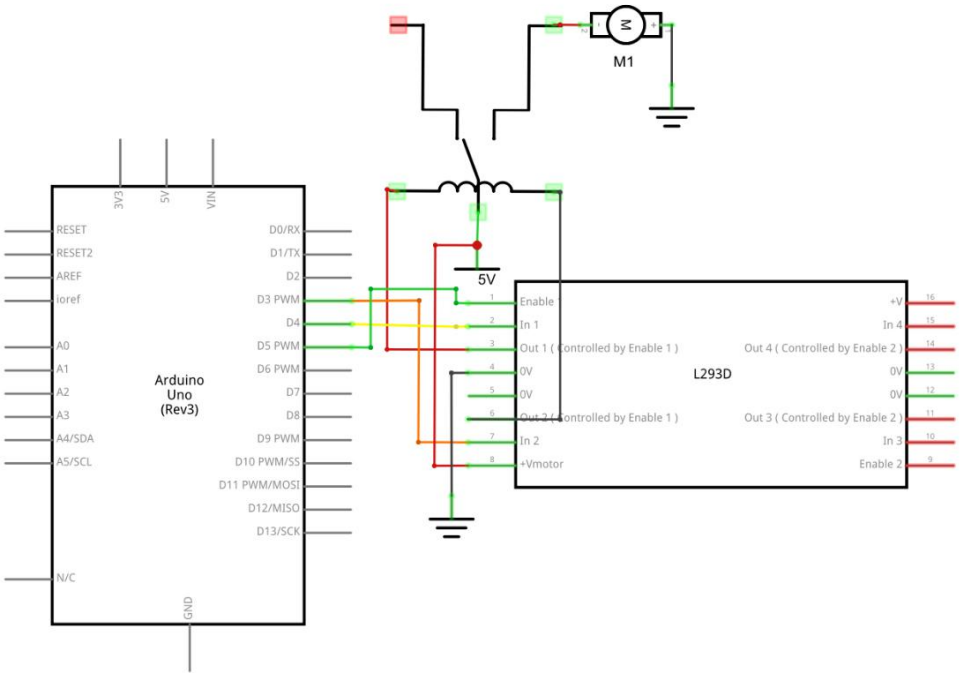
```
    for (i=0;i<5;i++) {
  digitalWrite(I1,HIGH); //one way
  digitalWrite(I2,LOW);
  delay(1000);
  digitalWrite(I1,LOW);   //reverse
  digitalWrite(I2,HIGH);
  delay(1000);
 }
  digitalWrite(E1,LOW); // disable
  delay(3000);
}
```

Experimental Procedures

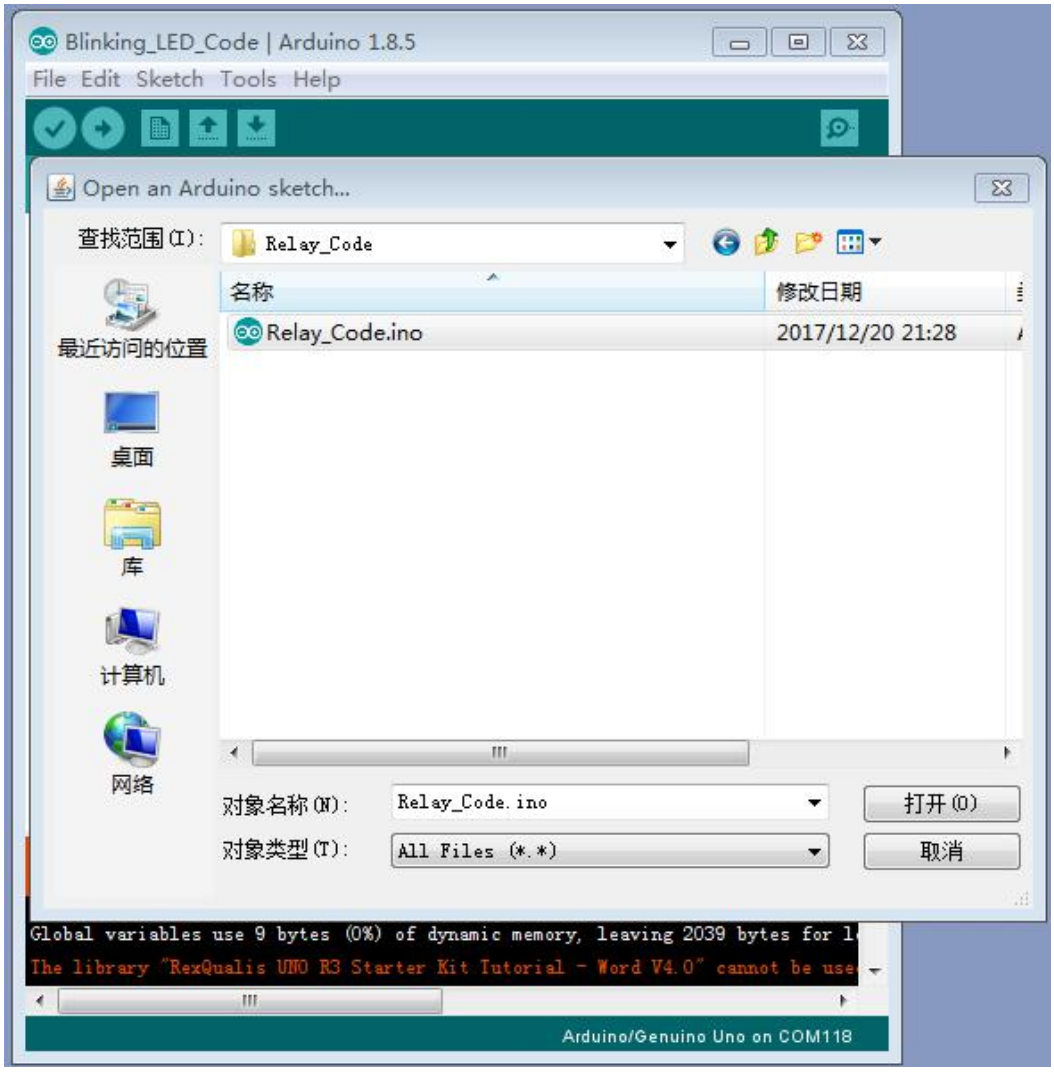
Step 1:Build the circuit



Schematic Diagram

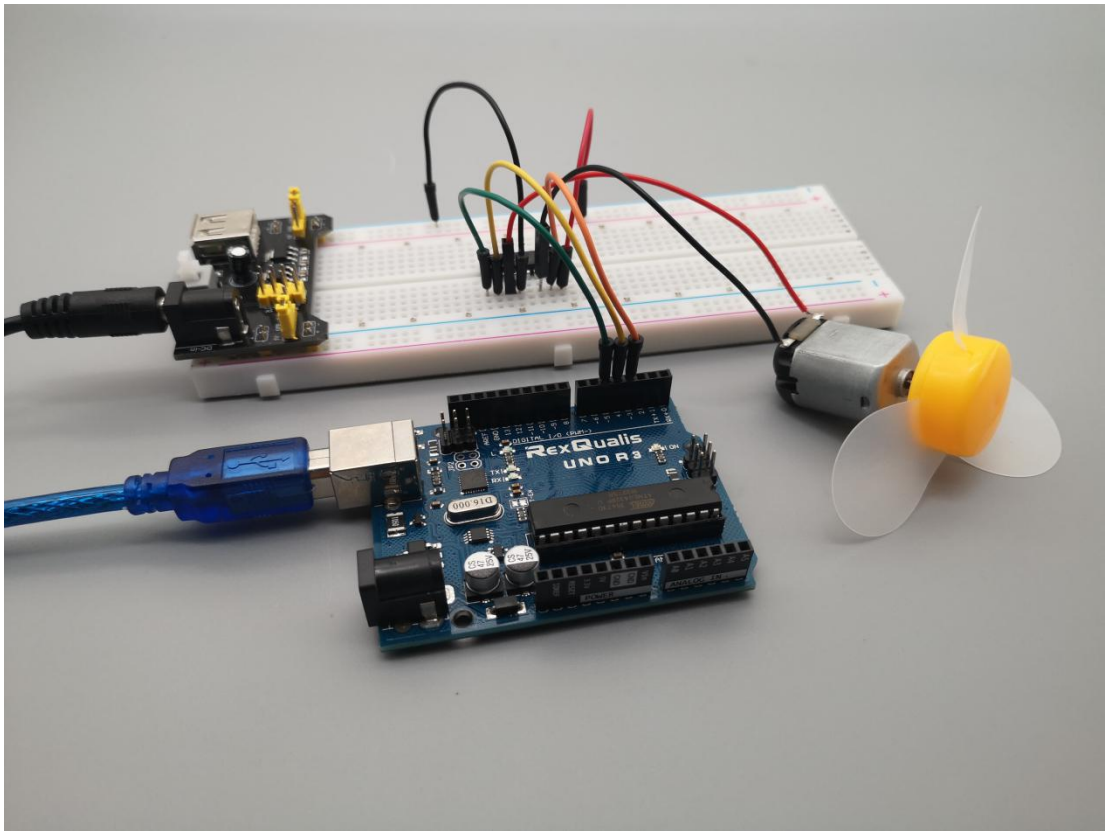


Step 2:Open the code:Relay_Code



Step 3: Attach Arduino UNO R3 board to your computer via USB cable and check that the 'Board Type' and 'Serial Port' are set correctly.

Step 4: Upload the code to the RexQualis UNO R3 board.



If it isn’ t working, make sure you have assembled the circuit correctly, verified and uploaded the code to your board. For how to upload the code and install the library, check Lesson 0 Preface.