Part Number : FK-FA1421

Product Name : 6-CHANNEL RELAY CARD

This Relay Card circuit is the module connect to microcontroller board or various experimental board such as ARDUINO, PIC or AVR. The voltage released of about 5-12 volts will cause the relay to work as programmed in IC memory. *Opto-Coupler* device is the main advantage of this circuit. It is used to separate ground between microcontroller board and the relay card board. Making it possible to control noise and prevents damage to the microcontroller board.

Specification

1.Power Supply direct from external power supply 12VDC or 12VAC. @ 460mA. Max.

2.Signal control : 5-12VDC. From the microcontroller board.

3. Output : 6 relays, 2 groups ground separate.

4.PCB dimensions : 1.60 x 2.20 inches.

Circuit Function

Figure 1 presents the FK1421 circuit diagram. When supply voltage at Channel1, the current will pass through R1, pin1 and pin2 of IC1, then complete loop at CG1. From this, the output pin3 will conduct current out through pin4 of the IC. The relay then start working and LED1 on. This working is the same for other Channels.

CG1 is assigned as the common point of Channels 1-3 input, while Channels 4-6 use CG2 as the common. For working of overall 6 Channels, the relay output will use point G as the common.

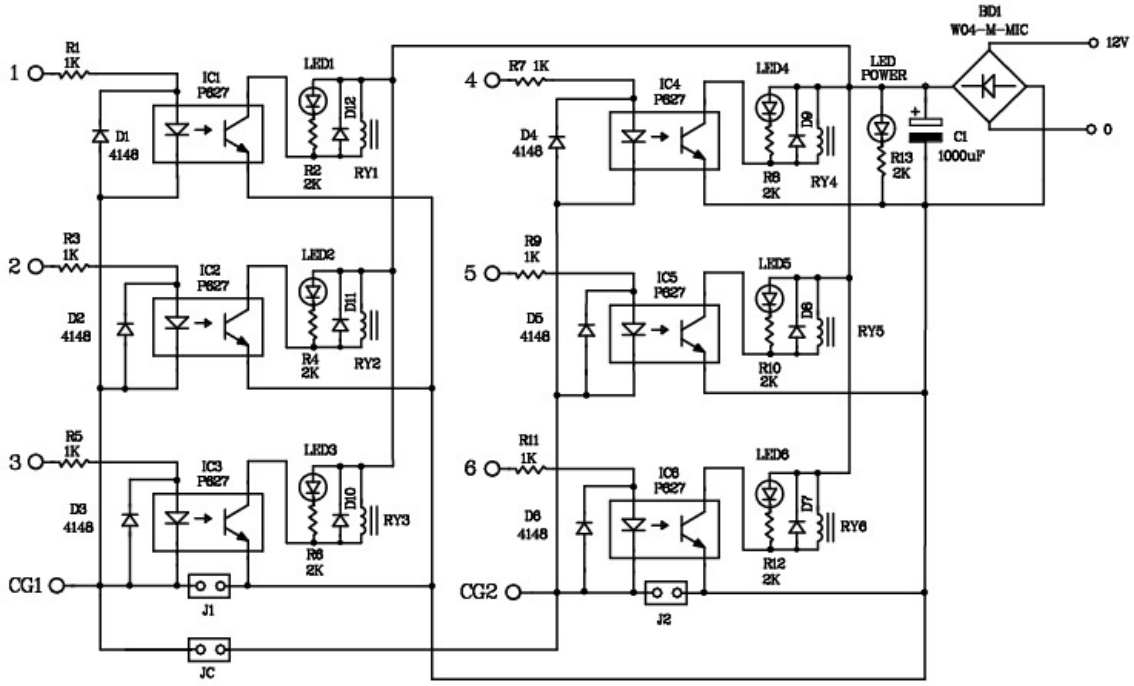

Figure 1. Circuit Diagram of FK1421

Circuit Assembling

According to Figure 2, the easy assembling should be started with putting the smallest part on the circuit which is resistor. Caution, all parts must be on the right electrodes such as LED. Please see Figure 3 for putting parts on electrodes. On the soldering, use a soldering iron max. 40 watts and tin/lead at 60/40 with flux. After assembling and soldering, re-check the positions of each part. In case some parts are on the wrong positions, use solder suction or solder wick to correct the positioning of those parts.

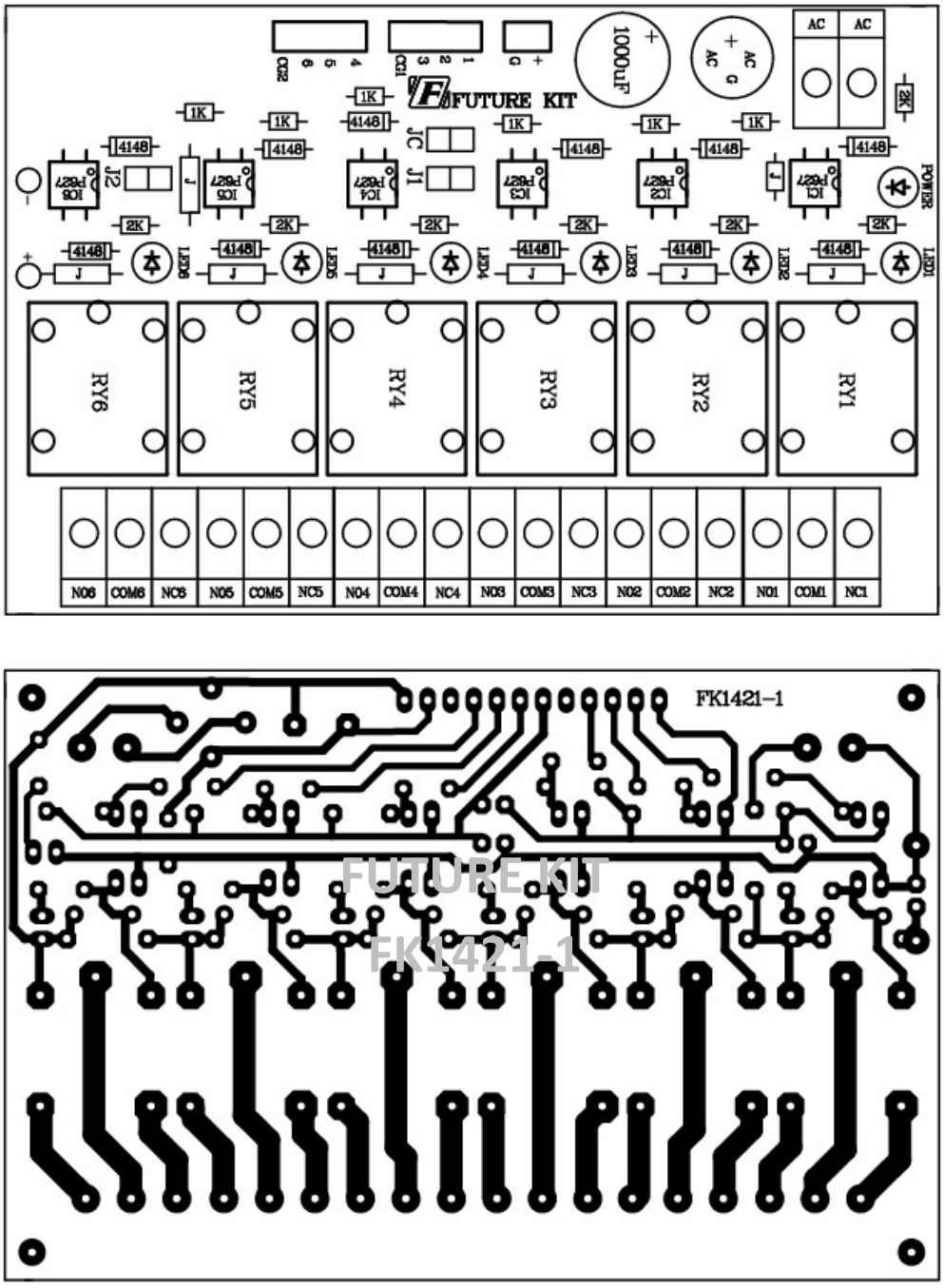

Figure 2. The positions for assembling and PCB copper line.

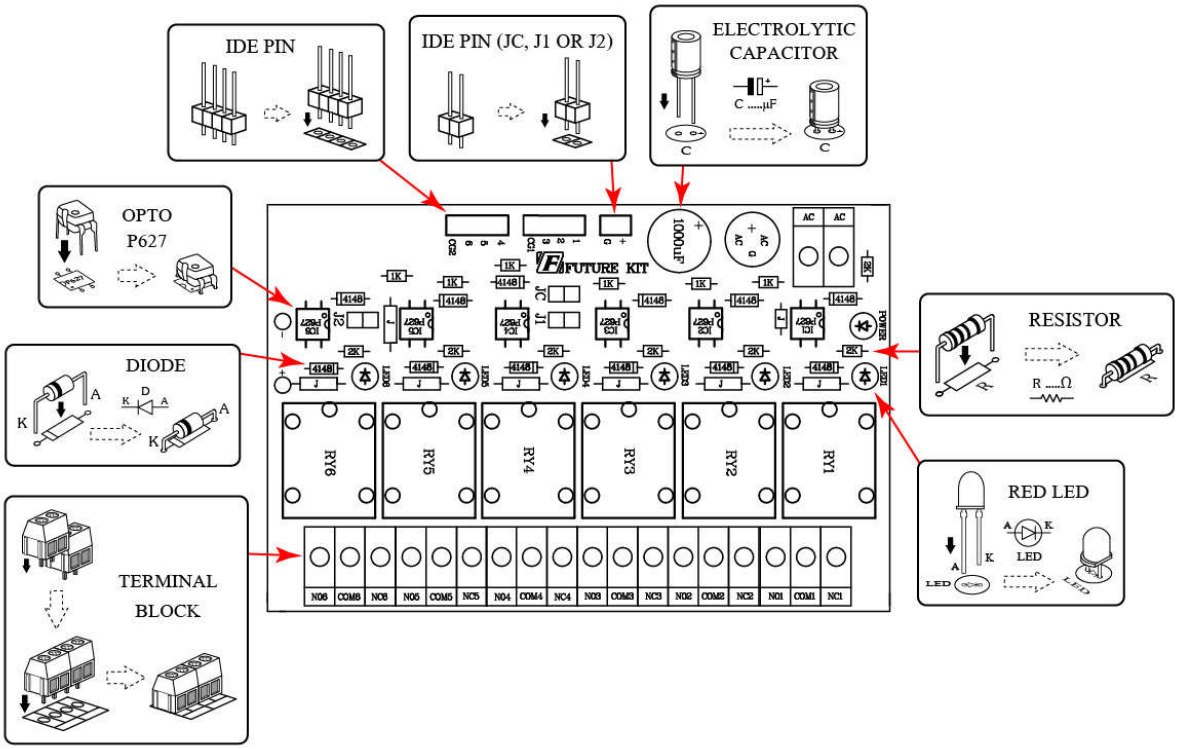

Figure 3. Positioning the parts on PCB

Programming instrument for the experimental board

1.FK-FA1421 6-CHANNEL RELAY CARD	1	set
2. 12VDC 500mA. Power Adaptor	1	Piece
3. Microcontroller Board ex. Arduino UNO R3	1	set
4. USB Cable	1	Piece
5. Computer Set	1	Set
6. Arduino Software	1	Piece

Testing Arduino UNO R3 Board

1.Connect USB cable with USB port of computer and USB port of Arduino UNO R3 Board.

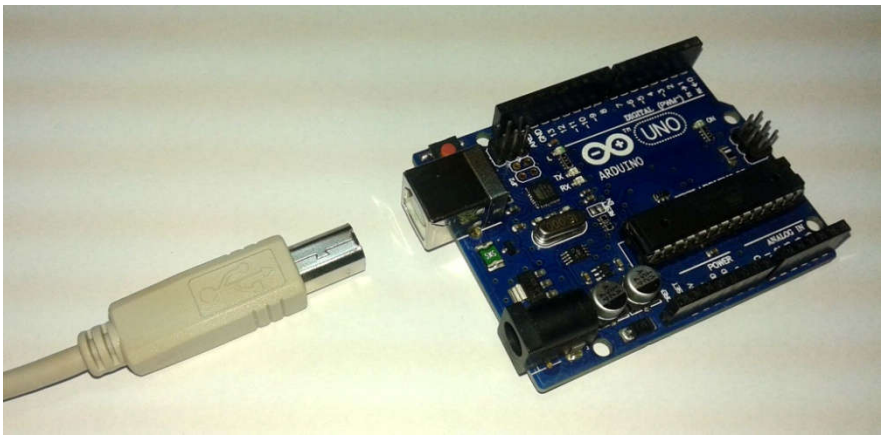

Figure 4. Connecting USB cable with USB port of Arduino Board

2. Open Arduino program by double-click on Arduino icon. Go to the menu bar, click on File and choose Open. Go to “EX” folder, open “TEST” folder and click on “Test” file.

Figure 5. Opening Arduino program

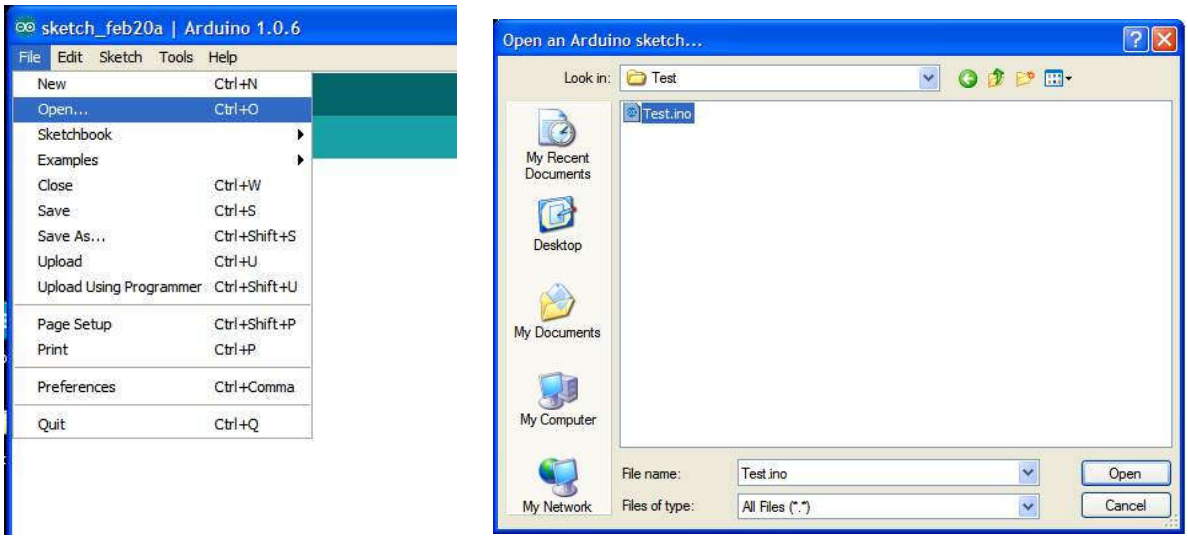

Figure 6. TEST Program

3.Download TEST program to Arduino Board.

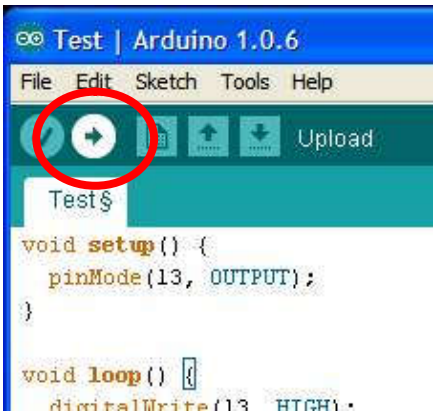

Figure 7. Downloading TEST program

4.After downloading, the LED L on Arduino Board will blink which means Arduino board is working.

Figure 8. The position of LED L on Arduino Board circuit

The details of TEST program, Flashing Light Program, Arduino UNO R3 experiment.

```
void setup() {
  pinMode(13, OUTPUT);          // Set the pin 13 is OUTPUT pin.
}
void loop() {
  digitalWrite(13, HIGH);       // LED at the pin 13 is light-on.
  delay(1000);                  // delay time 1 second
  digitalWrite(13, LOW);        // LED at the pin 13 is light-off.
  delay(1000);                  // delay time 1 second
}
```

The method to connect the circuit with Arduino UNO R3 board

Connect FK1421 board with Arduino UNO R3 board by following Figure 9. With Point 1-6 are connect to A0-A5 ports, + point is connect to Vin point and G point is connect to GND.

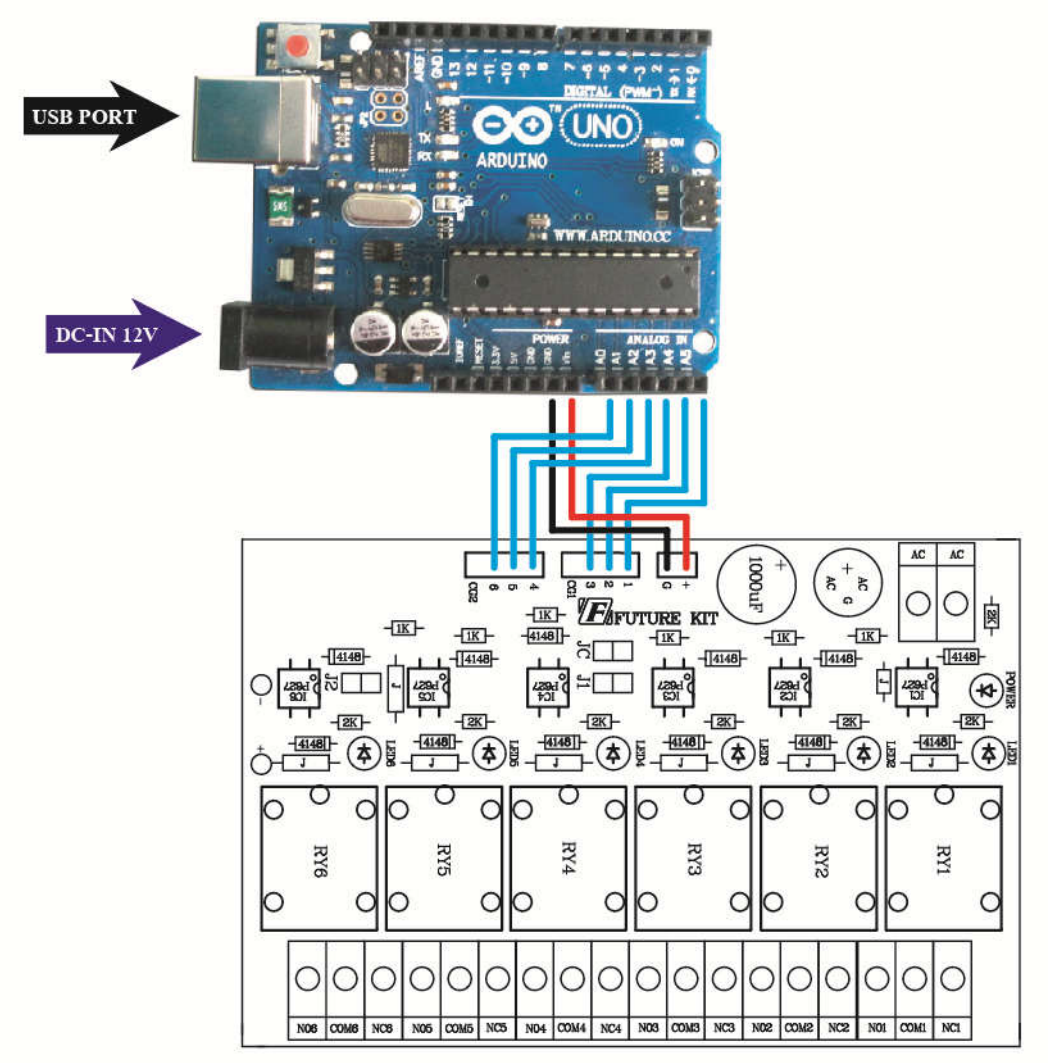

Figure 9. Connecting FK1421 board with Arduino UNO R3 board

Programming

1.Connect Arduino UNO R3 board with experimental board by following the instruction of the method to connect the circuit with Arduino UNO R3 board. And then jumping the jumper at J1, J2 point and JG point and connect the power adaptor to DC-IN on Arduino board

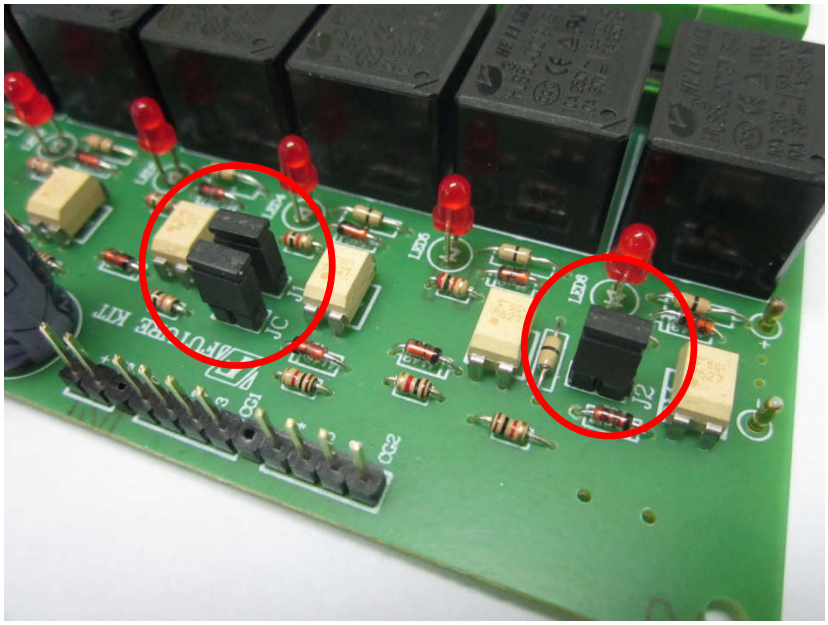

Figure 10. Jumping the jumper at J+ point and G point

2.Connect the USB cable with USB port of computer and USB port of Arduino UNO R3 board.

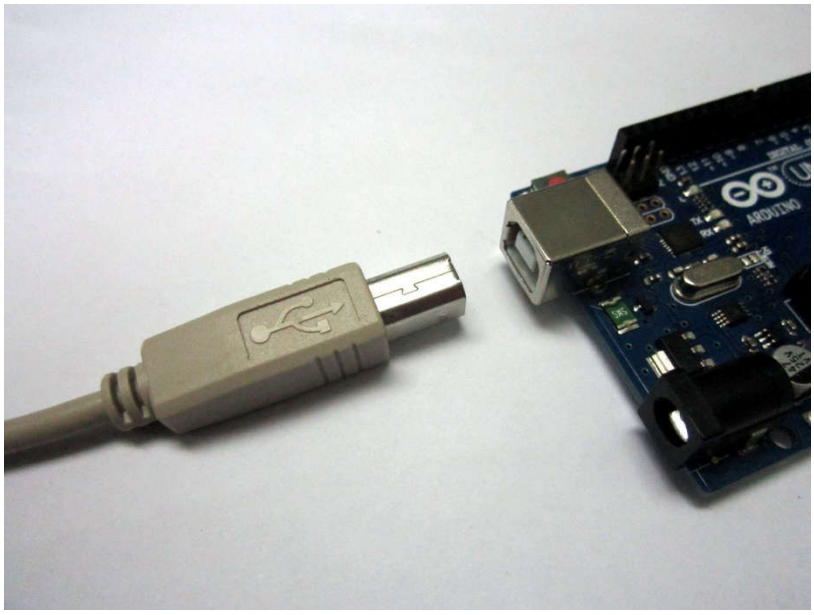

Figure 11. Wiring the USB cable

3.Double-click on Arduino icon to open Arduino program. Go to “File” in menu bar and choose “Open”. Click on folder “Ex”, choose folder “LAB1421-1” and click on file “LAB1421-1”.

Figure 12. Opening Arduino Program

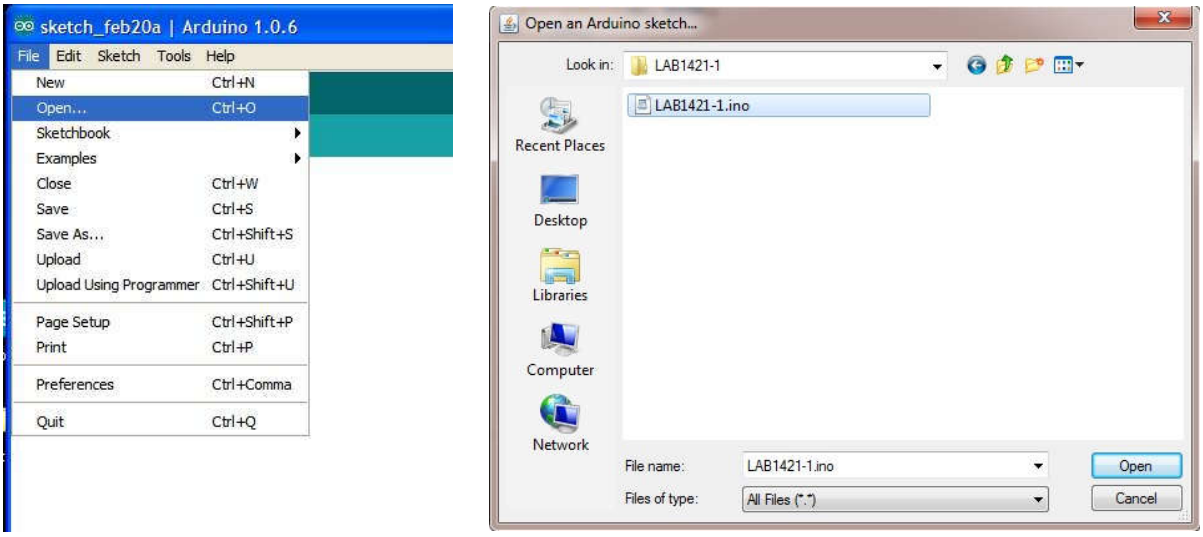

Figure 13. LAB1421-1 program

4. Download LAB1421-1 program to Arduino board. After downloading, there will be the sound of relay is working and stop working alternately. Observe LED2-6 from each channel will light on according to the connection.

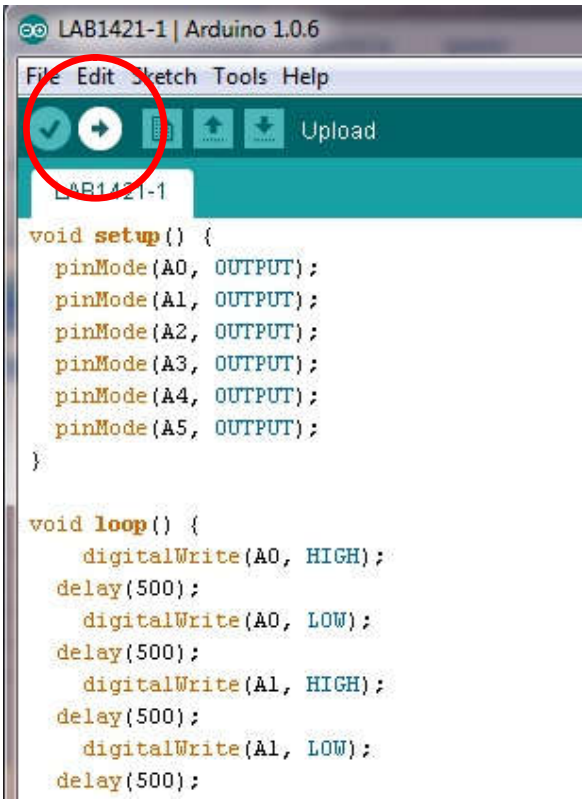

Figure 14. Downloading LAB1421-1 program

Using

1.Point AC is for power input, can switch from any + or -, both 12 volts adapter or direct 12 VDC.

2. Connections of voltage control are as follows :

- Group1, connect point 1, 2 ,3 and CG1. Remove J1 and JC when separate the ground input from output.

- Group2, connect point 4 ,5 ,6 and CG2. Remove J2 and JC when separate the ground input from output.

3. In case to combine the ground, connect all the jumpers.

4. Points COM, NO, and NC are the contact connector of relay in each Channel.

The details of LAB1421-1 RELAY TEST program

```
void setup() {
        pinMode(A0, OUTPUT);        // Set the pin A0 is OUTPUT pin.
        pinMode(A1, OUTPUT);        // Set the pin A1 is OUTPUT pin.
        pinMode(A2, OUTPUT);        // Set the pin A2 is OUTPUT pin.
        pinMode(A3, OUTPUT);        // Set the pin A3 is OUTPUT pin.
        pinMode(A4, OUTPUT);        // Set the pin A4 is OUTPUT pin.
        pinMode(A5, OUTPUT);        // Set the pin A5 is OUTPUT pin.
}
void loop() {
        digitalWrite(A0, HIGH);     // RELAY1 at the pin A0 is working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A0, LOW);      // RELAY1 at the pin A0 is stop working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A1, HIGH);     // RELAY2 at the pin A1 is working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A1, LOW);      // RELAY2 at the pin A1 is stop working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A2, HIGH);     // RELAY3 at the pin A2 is working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A2, LOW);      // RELAY3 at the pin A2 is stop working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A3, HIGH);     // RELAY4 at the pin A3 is working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A3, LOW);      // RELAY4 at the pin A3 is stop working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A4, HIGH);     // RELAY5 at the pin A4 is working.
        delay(500);                 // delay time 0.5 second
        digitalWrite(A4, LOW);      // RELAY5 at the pin A4 is stop working.
```

```
        delay(500);                    // delay time 0.5 second
        digitalWrite(A5, HIGH);        // RELAY6 at the pin A5 is working.
        delay(500);                    // delay time 0.5 second
        digitalWrite(A5, LOW);         // RELAY6 at the pin A5 is stop working.
        delay(500);                    // delay time 0.5 second
}
```

Function of LAB1421-1 program

The program will set the pin A0-A5 as OUTPUT pin. Relay1-Relay6 will be working at 0.5 second and stop working at 0.5 second alternately.

Remark: In case we want LED ON/OFF to blink frequency, reduce the value in the parentheses by commanding “delay”. The unit of the digit is millisecond.