

OVERVIEW

The LCD Dev board is a general purpose prototyping aide with the most common and useful elements in microcontroller or electronics work. This board contains LEDs, Buttons, Switches, Potentiometers, an active buzzer and an I2C interfaced alphanumeric LCD in a compact form factor.

This board is meant to be used with a microcontroller board or logic circuit, with or without a breadboard. The board serves as input/output board to quickly test, simulate, troubleshoot or demonstrate a project without extensive wiring as what happens when doing the same in a breadboard alone.

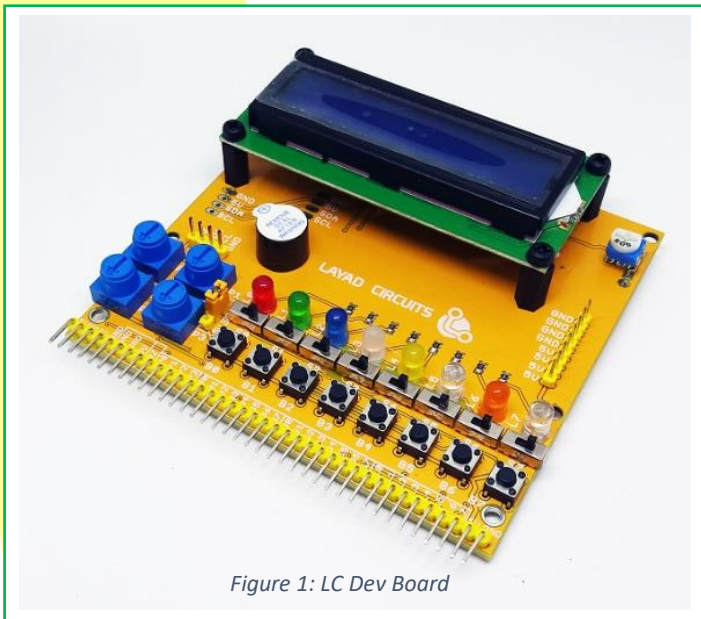


Figure 1: LC Dev Board

BOARD FEATURES

- 8x LEDs
- 8x Switches
- 8x Buttons
- 4x Potentiometer
- 1x Buzzer
- 1x I2C module

- 1x 16x2 LCD Display
- 38 pin main header, extra I2C header, 8-pin power headers
- Top facing LCD contrast adjust potentiometer

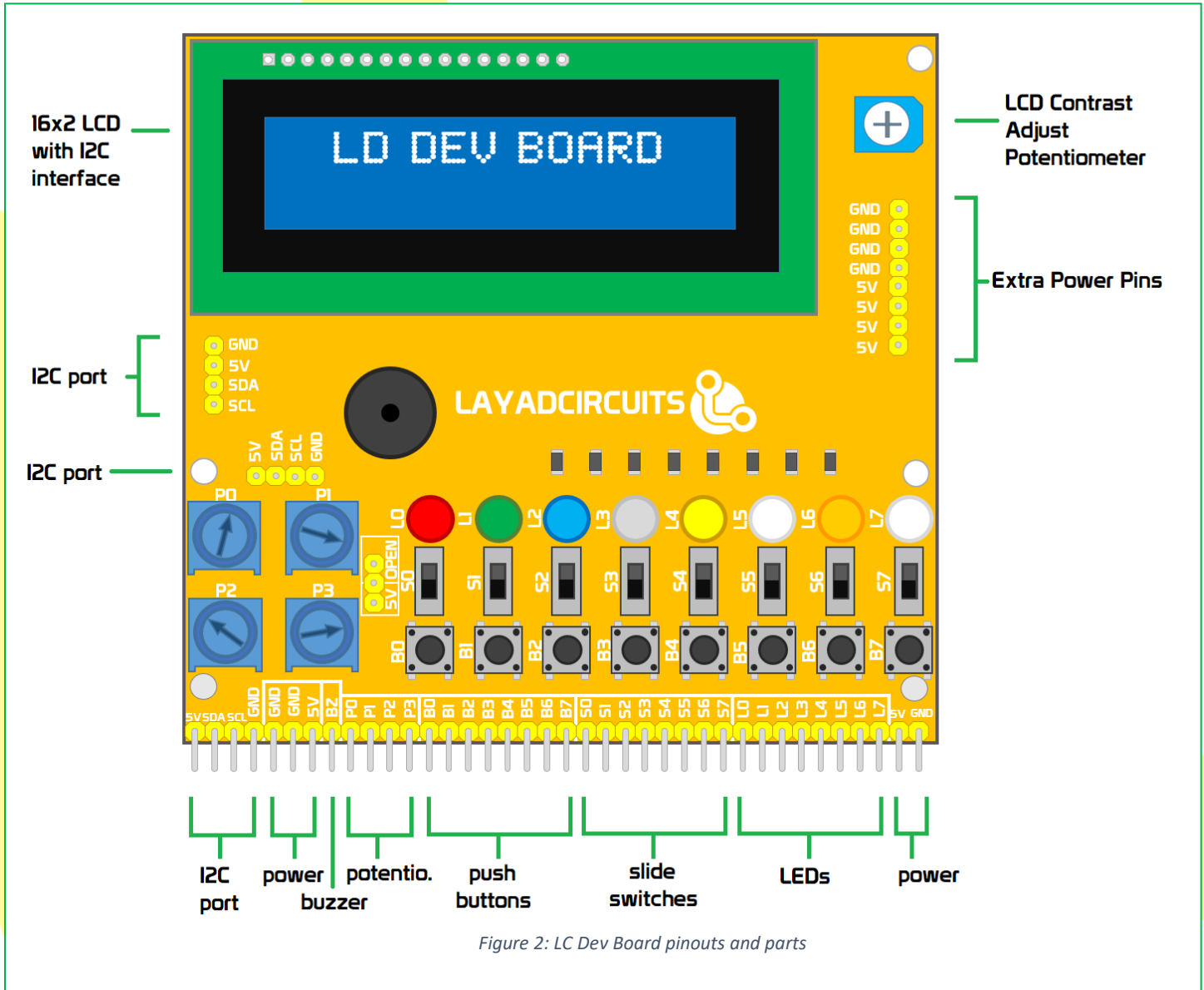
PIN FUNCTIONS

PINS	Function/Operation/Remarks
5V PIN	Power pin. All 5V pins are internally connected
GND PIN	Ground pin. All GND pins are internally connected
L0 – L7	LED pins. Apply 5V turns on the corresponding on board LED.
S0 – S7	Switch pins. When the slide switch is at the right position, corresponding Sn pin is pulled low. At the left position, the Sn pin is either floating (open circuit) or at 5V depending on the position of the micro jumper (5V or OPEN)
B0 – B7	Button pins. When pressed, the corresponding pin is pulled low. Pin is floating (open circuit) when button is unpressed.
P0 – P3	Potentiometer pins. These pins will output an analog voltage between 0 and the Vcc (5V pin) based on the wiper knob position of the potentiometers. The ends of the potentiometer are internally wired to 5V and GND pins.
BZ PIN	Buzzer pin. Apply 5V to generate sound from the active buzzer. When high, this pin can draw up to of 40mA. This is okay for AVR based Arduino's but may be excessive for Raspberry Pi, ESP8266 or ESP32 or ARM based boards. Use a driver transistor if needed.
SDA PIN	SDA pin of the I2C port. All SDA pins are internally connected.
SCL PIN	SCL pin of the I2C port. All SCL pins are internally connected

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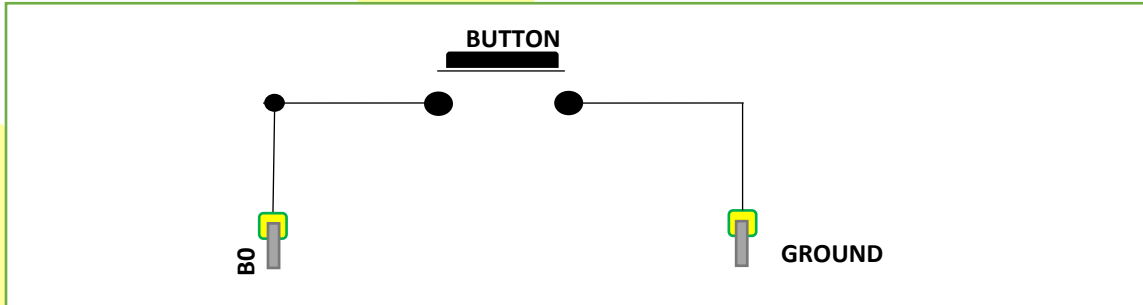
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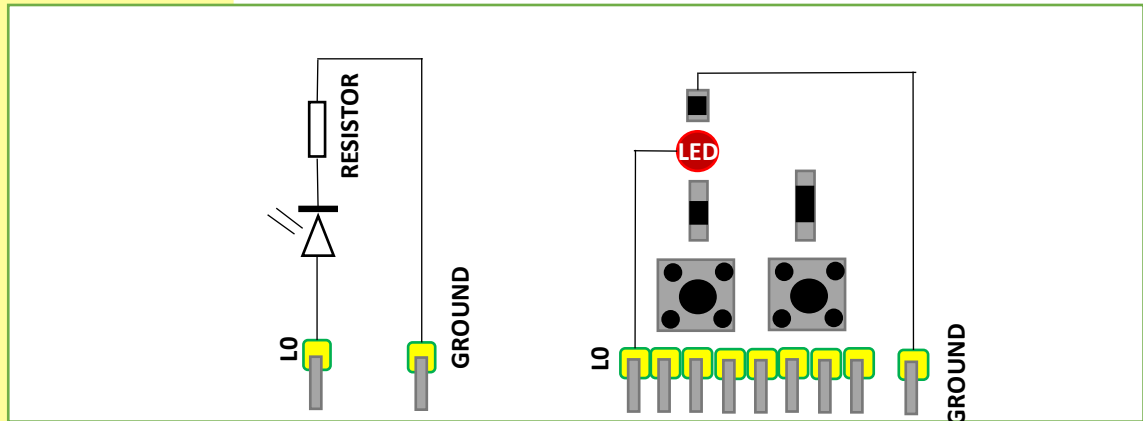


CIRCUITS

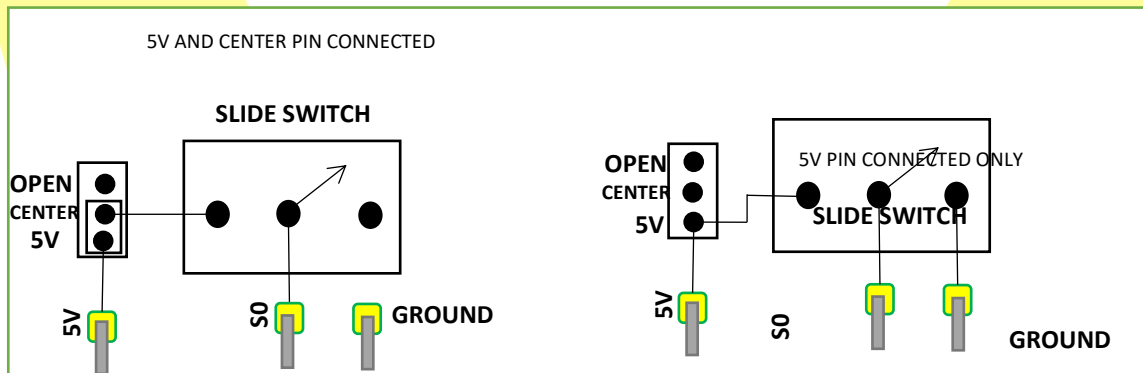
Button Circuit



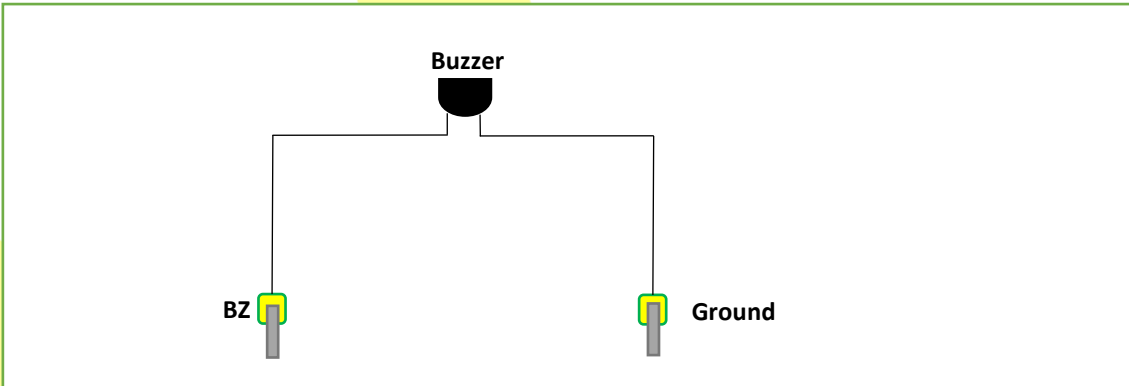
LEDS Circuit



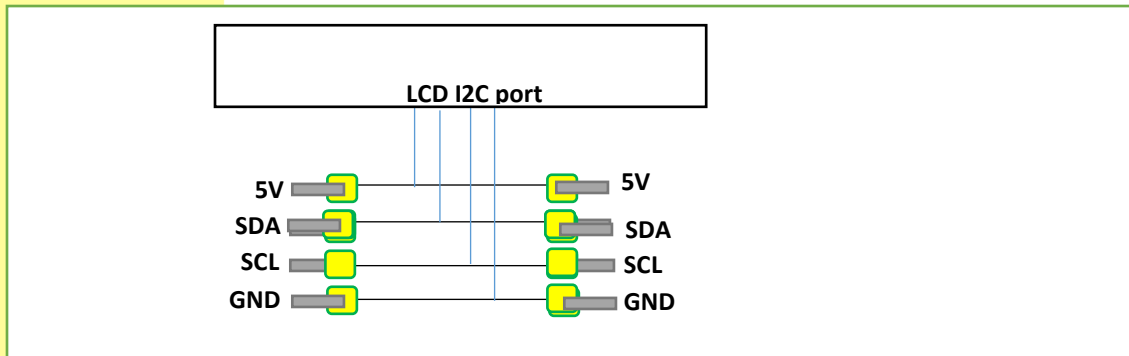
Switch Circuit



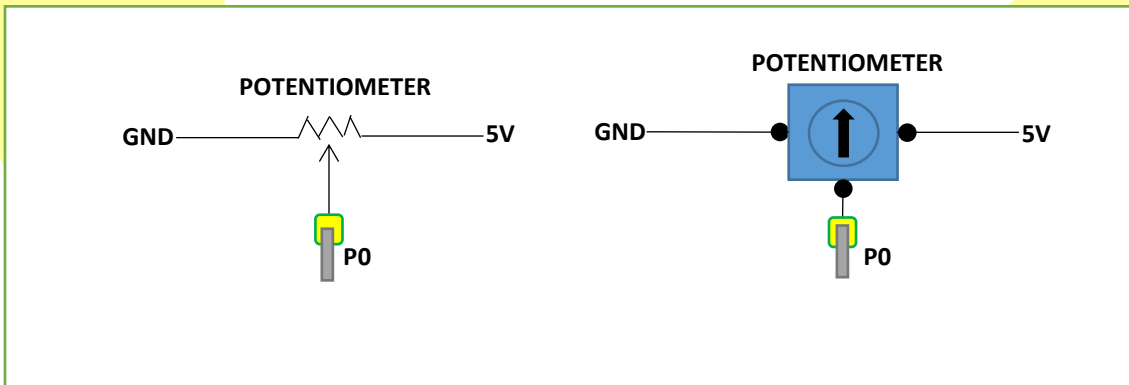
Buzzer Circuit



I2C Circuit – parallel with LCD port

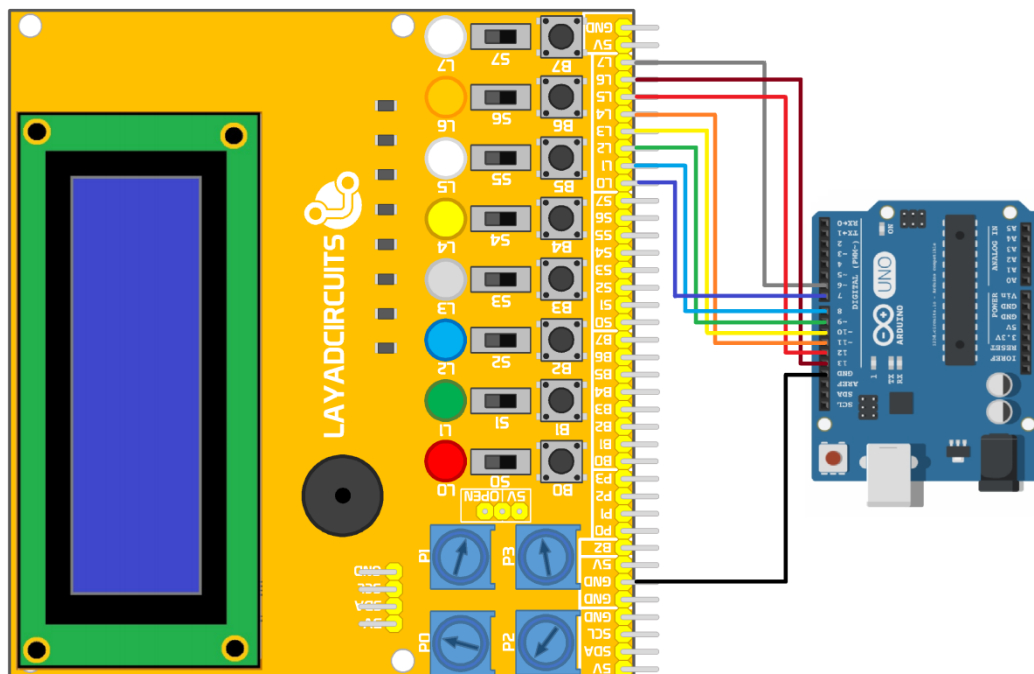


Potentiometer Circuit



EXAMPLES – the following are simple examples to demonstrate usage and capability of the module

Example: Running LED



CONNECTIONS

ARDUINO	LC DEV BOARD
D6	L7
D7	L1
D8	L2
D9	L3
D10	L4
D11	L5
D12	L6
D13	L7
GND	GND

CODE:

```
int led7 = 7;
int led8 = 8;
int led9 = 9;
int led10 = 10;
int led11 = 11;
int led12 = 12;
int led13 = 13;
int led6 = 6;
void setup() {

  pinMode(led7, OUTPUT);
  pinMode(led8, OUTPUT);
  pinMode(led9, OUTPUT);
  pinMode(led10, OUTPUT);
  pinMode(led11, OUTPUT);
  pinMode(led12, OUTPUT);
  pinMode(led13, OUTPUT);
  pinMode(led6, OUTPUT);
}

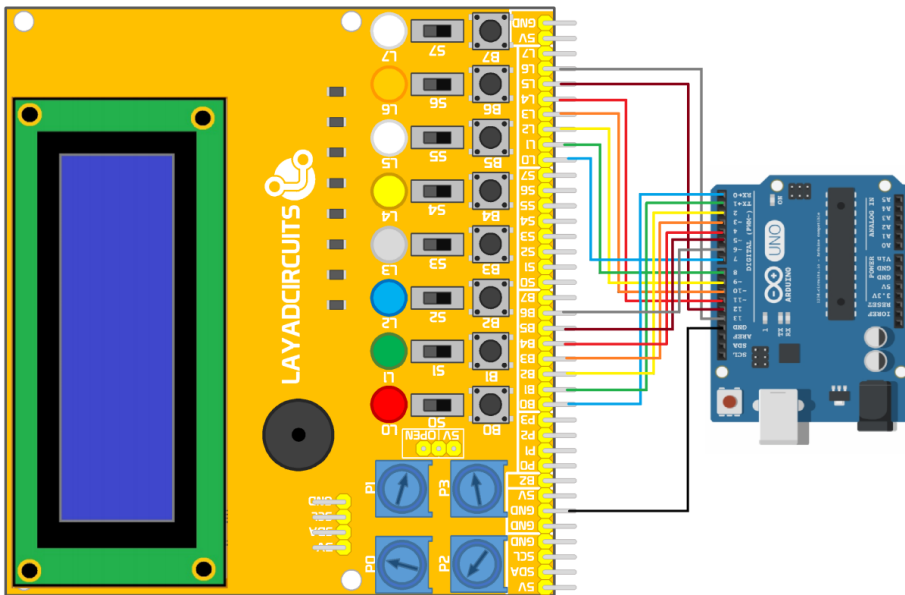
void loop() {
  digitalWrite(led7, HIGH);
  delay(100);
  digitalWrite(led7, LOW);
  delay(100);
  digitalWrite(led8, HIGH);
  delay(100);
  digitalWrite(led8, LOW);
  delay(100);
  digitalWrite(led9, HIGH);
  delay(100);
  digitalWrite(led9, LOW);
  delay(100);
  digitalWrite(led10, HIGH);
  delay(100);
  digitalWrite(led10, LOW);
  delay(100);
  digitalWrite(led11, HIGH);
  delay(100);
  digitalWrite(led11, LOW);
  delay(100);
  digitalWrite(led12, HIGH);
  delay(100);
  digitalWrite(led12, LOW);
  delay(100);
  digitalWrite(led13, HIGH);
  delay(100);
  digitalWrite(led13, LOW);
  delay(100);
  digitalWrite(led6, HIGH);
  delay(100);
  digitalWrite(led6, LOW);
  delay(100);
}
```

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Example: Using buttons to control LEDs - Pressing the push buttons will turn on the corresponding LED



CONNECTIONS

ARDUINO	LC DEV BOARD
D0	B0
D1	B1
D2	B2
D3	B3
D4	B4
D5	B5
D6	B6
D7	L0
D8	L1
D9	L2
D10	L3
D11	L4
D12	L5
D13	L6
GND	GND

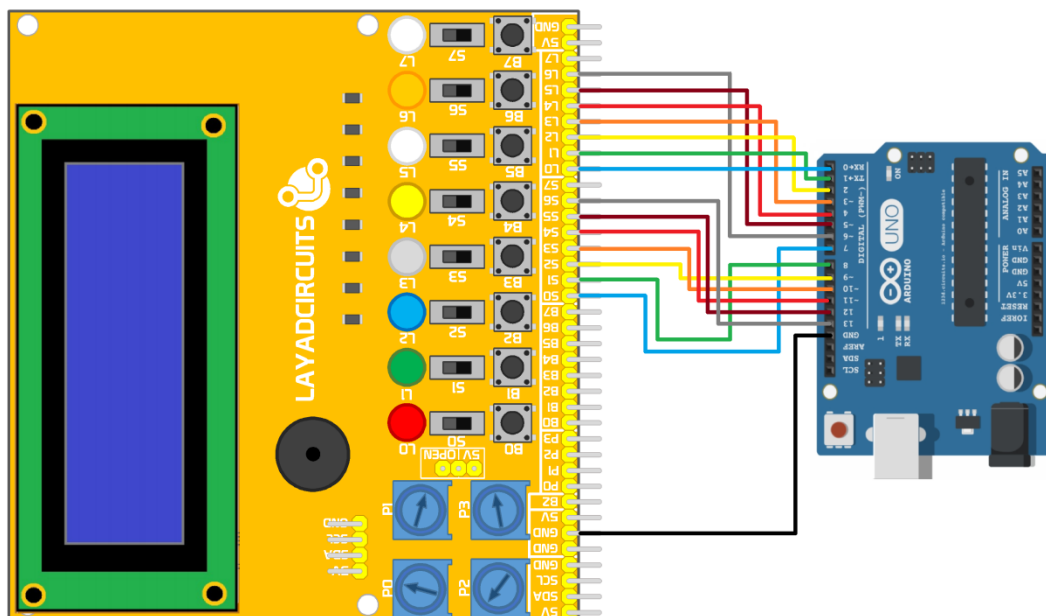
CODE:

```
int ledPin7 = 7;
int ledPin8 = 8;
int ledPin9 = 9;
int ledPin10 = 10;
int ledPin11 = 11;
int ledPin12 = 12;
int ledPin13 = 13;
int button0 = 0;
int button1 = 1;
int button2 = 2;
int button3 = 3;
int button4 = 4;
int button5 = 5;
int button6 = 6;
byte leds = 0;

void setup()
{
  pinMode(ledPin7, OUTPUT);
  pinMode(ledPin8, OUTPUT);
  pinMode(ledPin9, OUTPUT);
  pinMode(ledPin10, OUTPUT);
  pinMode(ledPin11, OUTPUT);
  pinMode(ledPin12, OUTPUT);
  pinMode(ledPin13, OUTPUT);
  pinMode(button0, INPUT_PULLUP);
  pinMode(button1, INPUT_PULLUP);
  pinMode(button2, INPUT_PULLUP);
  pinMode(button3, INPUT_PULLUP);
  pinMode(button4, INPUT_PULLUP);
  pinMode(button5, INPUT_PULLUP);
  pinMode(button6, INPUT_PULLUP);
}

void loop()
{
  if (digitalRead(button0) == LOW){digitalWrite(ledPin7, HIGH);}
  else{digitalWrite(ledPin7, LOW);}
  if (digitalRead(button1) == LOW){digitalWrite(ledPin8, HIGH);}
  else{digitalWrite(ledPin8, LOW);}
  if (digitalRead(button2) == LOW){digitalWrite(ledPin9, HIGH);}
  else{digitalWrite(ledPin9, LOW);}
  if (digitalRead(button3) == LOW){digitalWrite(ledPin10, HIGH);}
  else{digitalWrite(ledPin10, LOW);}
  if (digitalRead(button4) == LOW){digitalWrite(ledPin11, HIGH);}
  else{digitalWrite(ledPin11, LOW);}
  if (digitalRead(button5) == LOW){digitalWrite(ledPin12, HIGH);}
  else{digitalWrite(ledPin12, LOW);}
  if (digitalRead(button6) == LOW){digitalWrite(ledPin13, HIGH);}
  else{digitalWrite(ledPin13, LOW);}
}
```


Example: Using switches to control LEDs - toggle the slide switches to control LEDs



CONNECTIONS

ARDUINO	LC DEV BOARD
D0	L0
D1	L1
D2	L2
D3	L3
D4	L4
D5	L5
D6	L6
D7	S0
D8	S1
D9	S2
D10	S3
D11	S4
D12	S5
D13	S6
GND	GND

CODE:

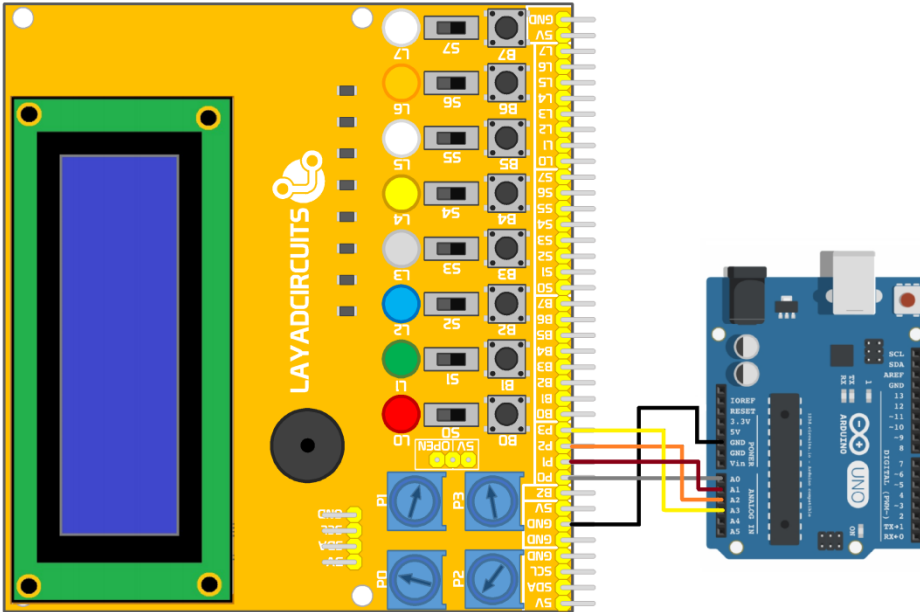
```
int led0 = 0;
int led1 = 1;
int led2 = 2;
int led3 = 3;
int led4 = 4;
int led5 = 5;
int led6 = 6;
int sw0 = 7;
int sw1 = 8;
int sw2 = 9;
int sw3 = 10;
int sw4 = 11;
int sw5 = 12;
int sw6 = 13;

void setup()
{
  pinMode(led0, OUTPUT);
  pinMode(led1, OUTPUT);
  pinMode(led2, OUTPUT);
  pinMode(led3, OUTPUT);
  pinMode(led4, OUTPUT);
  pinMode(led5, OUTPUT);
  pinMode(led6, OUTPUT);
  pinMode(sw0, INPUT_PULLUP);
  pinMode(sw1, INPUT_PULLUP);
  pinMode(sw2, INPUT_PULLUP);

  pinMode(sw3, INPUT_PULLUP);
  pinMode(sw4, INPUT_PULLUP);
  pinMode(sw5, INPUT_PULLUP);
  pinMode(sw6, INPUT_PULLUP);
}

void loop()
{
  if (digitalRead(sw0) ==
LOW){digitalWrite(led0, HIGH);}
  else{digitalWrite(led0, LOW);}
  if (digitalRead(sw1) ==
LOW){digitalWrite(led1, HIGH);}
  else{digitalWrite(led1, LOW);}
  if (digitalRead(sw2) ==
LOW){digitalWrite(led2, HIGH);}
  else{digitalWrite(led2, LOW);}
  if (digitalRead(sw3) ==
LOW){digitalWrite(led3, HIGH);}
  else{digitalWrite(led3, LOW);}
  if (digitalRead(sw4) ==
LOW){digitalWrite(led4, HIGH);}
  else{digitalWrite(led4, LOW);}
  if (digitalRead(sw5) ==
LOW){digitalWrite(led5, HIGH);}
  else{digitalWrite(led5, LOW);}
  if (digitalRead(sw6) ==
LOW){digitalWrite(led6, HIGH);}
  else{digitalWrite(led6, LOW);}
}
```

Example – show raw values read from potentiometer via ADC pins



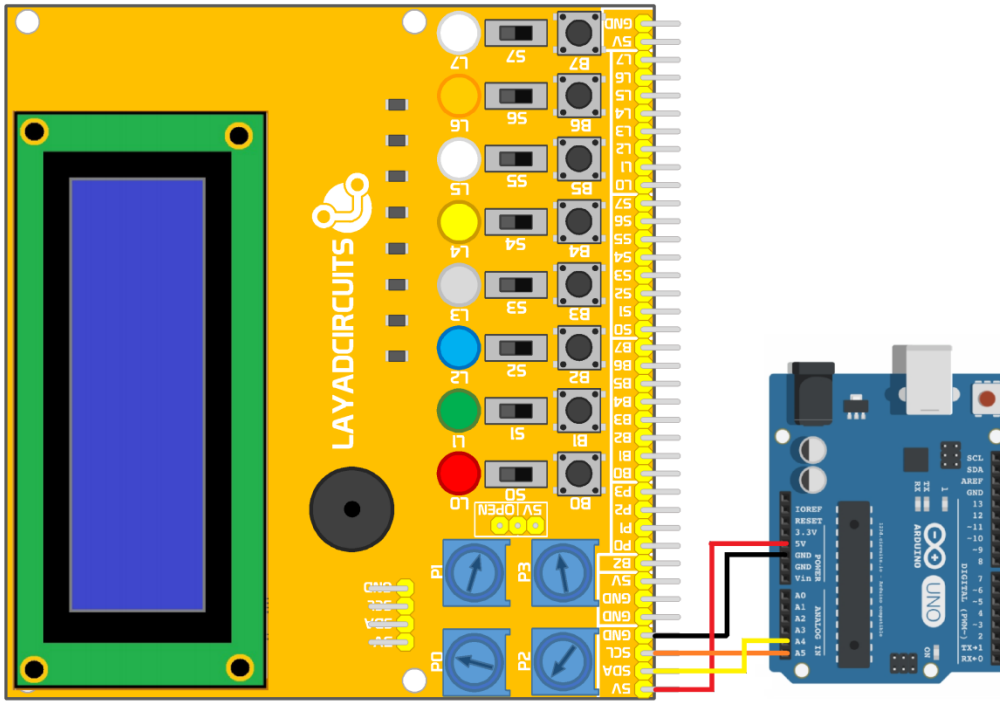
CONNECTIONS

ARDUINO	LC DEV BOARD
A0	B0
A1	B1
A2	B2
A3	BZ
GND	GND

CODE:

```
int value0;
int value1;
int value2;
int value3;
void setup() {
  Serial.begin(9600);
}
void loop() {
  value0 = analogRead(A0); //READS P0
  value1 = analogRead(A1); //READS P1
  value2 = analogRead(A2); //READS P2
  value3 = analogRead(A3); //READS P3
  Serial.println(value0); //READS P0
  Serial.println(value1); //READS P1
  Serial.println(value2); //READS P2
  Serial.println(value3); //READS P3
  delay(100); }
```

Example - LCD



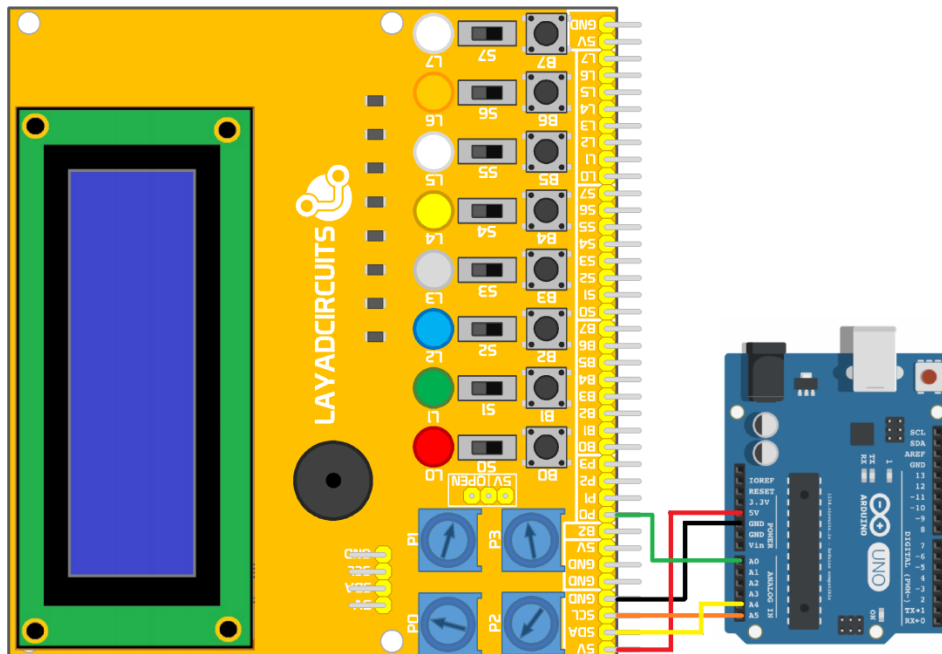
CONNECTIONS

ARDUINO	LC DEV BOARD
VCC	VCC
GND	GND
A4	SDA
A5	SCL

CODE:

```
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x3F,16,2); // change 0x3F to 0x27 if you have another module
void setup()
{
  lcd.init();
  lcd.backlight();
  lcd.setCursor(0,0);
  lcd.print("LC DEV BOARD");
  lcd.setCursor(0,1);
  lcd.print("LCD EXAMPLE ");
}
void loop()
{}
```

Example – display raw values of raw potentiometer readings in the LCD



CONNECTIONS

ARDUINO	LC DEV BOARD
VCC	VCC
GND	GND
A4	SDA
A5	SCL

CODE:

```
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x3F, 16, 2);
int value0;
void setup() {
  lcd.init();
  lcd.backlight();
}
void loop() {
  value0 = analogRead(A0);
  lcd.clear();
  lcd.setCursor(0,1);
  lcd.print(value0);
  lcd.setCursor(0,0);
  lcd.print("P0 ADC READING" );
  delay(100);
}
```

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