LCD KeyPad Shield For Arduino SKU: DFR0009

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Introduction

This is a very popular LCD Keypad shield for Arduino or Freeduino board. It includes a 2x16 LCD display and 6 momentary push buttons. Pins 4, 5, 6, 7, 8, 9 and 10 are used to interface with the LCD. Analog Pin 0 is used to read the push buttons. The LCD shield supports contrast adjustment and backlit on/off functions. It also expands analog pins for easy analog sensor reading and display.

The LCD Keypad shield is developed for Arduino compatible boards, to provide a user-friendly interface that allows users to go through the menu, make selections etc. It consists of a 1602 white character blue backlight LCD. The keypad consists of 5 keys — select, up, right, down and left. To save the digital IO pins, the keypad interface uses only one ADC channel. The key value is read through a 5 stage voltage divider.

Specification

- Operating Voltage: 5V
- 5 Push buttons to supply a custom menu control panel
- RST button for resetting arduino program
- Integrate a potentiometer for adjusting the backlight
- Expanded available I/O pins
- Expanded Analog Pinout with standard DFRobot configuration for fast sensor extension
- Dimension: 80 x 58 mm

Pinout

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital 4(D4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital 6(D6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital 8(D8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital 10(D10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog 0(A0)</td>
<td>Button select</td>
<td>Select, up, right, down and left</td>
</tr>
</tbody>
</table>
Library Explanation

Function Explanation

LiquidCrystal(rs, enable, d4, d5, d6, d7)

Creates a variable of type LiquidCrystal. The display can be controlled using 4 or 8 data lines. If the former, omit the pin numbers for d0 to d3 and leave those lines unconnected. The RW pin can be tied to ground instead of connected to a pin on the Arduino; if so, omit it from this function's parameters. For example:

```
LiquidCrystal lcd(8, 9, 4, 5, 6, 7);
```

lcd.begin(cols, rows)

Initializes the interface to the LCD screen, and specifies the dimensions (width and height) of the display. begin() needs to be called before any other LCD library commands. For example:

```
lcd.begin(16, 2);
```

lcd.setCursor(col, row)

Set the location at which subsequent text written to the LCD will be displayed. For example:

```
lcd.setCursor(0,0);
```

lcd.print(data)

Prints text to the LCD. For example:

```
lcd.print("hello, world!");
```

lcd.write(data)

Write a character to the LCD.

More function can see:

- LiquidCrystal library
Tutorial

Example 1

This example will test the LCD panel and the buttons. When you push the button on the shield, the screen will show the corresponding one.

Connection: Plug the LCD Keypad to the UNO (or other controllers)

```c
#include <LiquidCrystal.h>

LiquidCrystal lcd(8, 9, 4, 5, 6, 7); // select the pins used on the LCD panel

// define some values used by the panel and buttons
int lcd_key = 0;
int adc_key_in = 0;
#define btnRIGHT 0
#define btnUP 1
#define btnDOWN 2
#define btnLEFT 3
#define btnSELECT 4
```
#define btnNONE 5

int read_LCD_buttons(){
  // read the buttons
  adc_key_in = analogRead(0); // read the value from the sensor

  // my buttons when read are centered at these values: 0, 144, 329, 504, 741
  // we add approx 50 to those values and check to see if we are close
  // We make this the 1st option for speed reasons since it will be the most likely result

  if (adc_key_in > 1000) return btnNONE;

  // For V1.1 use this threshold
  if (adc_key_in < 50) return btnRIGHT;
  if (adc_key_in < 250) return btnUP;
  if (adc_key_in < 450) return btnDOWN;
  if (adc_key_in < 650) return btnLEFT;
  if (adc_key_in < 850) return btnSELECT;

  // For V1.0 comment the other threshold and use the one below:
  /*
   *  if (adc_key_in < 50) return btnRIGHT;
   *  if (adc_key_in < 195) return btnUP;
   *  if (adc_key_in < 380) return btnDOWN;
   *  if (adc_key_in < 555) return btnLEFT;
   *  if (adc_key_in < 790) return btnSELECT;
   */

  return btnNONE; // when all others fail, return this.
}

void setup(){
  lcd.begin(16, 2); // start the library
  lcd.setCursor(0,0); // set the LCD cursor position
}
lcd.print("Push the buttons"); // print a simple message on the LCD

void loop()
{

tlcd.setCursor(9,1);
// move cursor to second line "1" and 9 spaces over

dlcd.print(millis()/1000);
// display seconds elapsed since power-up


dlcd.setCursor(0,1);
// move to the beginning of the second line


dlcd_key = read_LCD_buttons(); // read the buttons

switch (lcd_key)
{
// depending on which button was pushed, we perform an action

    case btnRIGHT:
    { // push button "RIGHT" and show the word on the screen
        lcd.print("RIGHT ");

        break;
    }

    case btnLEFT:
    { // push button "LEFT" and show the word on the screen
        lcd.print("LEFT  ");

        break;
    }

    case btnUP:
    { // push button "UP" and show the word on the screen
        lcd.print("UP    ");

        break;
    }

    case btnDOWN:
    { // push button "DOWN" and show the word on the screen
        lcd.print("DOWN  ");

        break;
    }

    case btnSELECT:
    { // push button "SELECT" and show the word on the screen
        lcd.print("SELECT");

    }

}
break;
}

```javascript
    case btnNONE:
        lcd.print("NONE "); // No action will show "None" on the screen
        break;

break;

}
```

Example 2

This example shows that reads an analog input on pin 1, prints the result to the LCD. This program takes the temperature sensor LM35 for example.

What you need

1. DFRduino UNO R3
2. LCD Keypad Shield For Arduino
3. Analog Linear Temperature Sensor

Connection:
Plug the LCD Keypad to the UNO(or other controllers)
Temperature sensor: S(blue) -- A1()

Note: A0 has been occupied.
VCC(red) -- VCC
GND(black) -- GND

Tricks for changing sensor cable pin mapping
**Sample code**

```c
/*******************************************************

Description:
Reads an analog input on pin 1, prints the result to the LCD.
This program takes the temperature sensor LM35 for example.

Connection:
Plug the LCD Keypad to the UNO(or other controllers)
Temperature sensor:
S(blue) -- A1()
   Note: A0 has been occupied.
VCC(red) -- VCC
```
#include <LiquidCrystal.h>

LiquidCrystal lcd(8, 9, 4, 5, 6, 7); // select the pins used on the LCD panel

unsigned long tepTimer;

void setup(){
  lcd.begin(16, 2); // start the library
}

void loop(){
  lcd.setCursor(0, 0); // set the LCD cursor position
  int val; // variable to store the value coming from the analog pin
  double data; // variable to store the temperature value coming from the conversion formula
  val = analogRead(1); // read the analog in value:
  data = (double) val * (5/10.24); // temperature conversion formula

  if(millis() - tepTimer > 500){ // output a temperature value per 500ms
    tepTimer = millis();

    // print the results to the lcd
    lcd.print("T: ");
    lcd.print(data);
  }
}
Trouble shooting

Q1. Why my LCD keypad cannot display anything on the Intel Edison while all right on Romeo?

A1: It works well if uploaded by Arduino 1.5.3 version, however, the latest 1.6.* have discard pin Definition for Edison. So you have to add pinMode(); into the setup() like this:

```c
void setup() {
  for(int i=4;i<10;i++){
    pinMode(i,OUTPUT);
  }
  lcd.begin(16, 2); // set up the LCD's number of columns and rows
}
```
Q2. I do not understand your schematic. There are too many connectors illustrated than are actually on the shield. Could you show me a mapping?

A2: The J1-J8 include the both the user interface, i.e. Analog pins, APC220(Serial) pins, Digital pins, and the pins connected with the lower Arduino card, e.g. Uno/ Leonardo. Here is a simple mapping picture.

For any questions and more cool ideas to share, please visit DFRobot Forum

https://www.dfrobot.com/wiki/index.php/LCD_KeyPad_Shield_For_ArduinoSKU:_DFR0009 8-3-18