

# Thermometer LCD with Xpresso LPC1769

## Project Report

13016244

Microprocessors and Interfacing

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<b>Introduction</b>	<b>2</b>
Project description	
Purpose	
<b>Hardware</b>	<b>2</b>
<b>Software</b>	<b>4</b>
<b>Source Code</b>	<b>5</b>

## **Project description**

A thermometer is a device that measures temperature or a temperature gradient. A thermometer has two important elements: (1) a temperature sensor (e.g. the bulb of a mercury-in-glass thermometer or the digital sensor in an infrared thermometer) in which some change occurs with a change in temperature, and (2) some means of converting this change into a numerical value (e.g. the visible scale that is marked on a mercury-in-glass thermometer or the digital readout on an infrared model). Thermometers are widely used in industries

## **Propose**

By doing this project to study more about the Xpresso board that can be apply it to use in real life. I hope this will going to be useful.

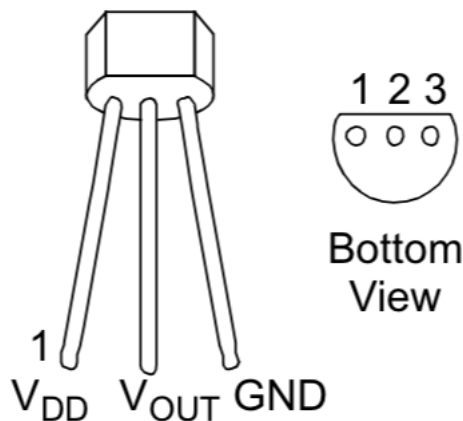
## **Hardware**

- 1x Xpresso board
- 1x Breadboard
- 1x 16x2 LCD display
- 1x MCP9700A
- Jumpers - to connect everything

## MCP9700A

- Wide temperature( -40 c – 150 c)
- Accuracy +-2
- Optimized for analog to digital converters(ADCs) 10mV/C
- VDD 2.3V – 5.5V

### **3-Pin TO-92** **MCP9700/9700A** **MCP9701/9701A**



## TFT-LCD

A Thin-film-transistor liquid-crystal display is a variant of a liquid-crystal display that uses thin-film-transistor technology to improve image qualities such as addressability and contrast. All the pixels on a TFT LCD screen are configured in a row and column format, and each pixel is attached to an amorphous silicon transistor that rests directly on the glass panel.

## Software

```
#include <mbed.h>
#include <stdio.h>
#include <string>
#include "SDFile/SDFileSystem.h"
#include "TFT/Arial28x28.h"
#include "TFT/SPI_TFT_ILI9341.h"
#include "TFT/Arial12x12.h"
#include "TFT/Arial24x23.h"
#include "TFT/font_big.h"
```

## Source Code

```
#include <mbed.h>
#include <stdio.h>
#include <string>
#include "SDFile/SDFileSystem.h"
#include "TFT/Arial28x28.h"
#include "TFT/SPI_TFT_ILI9341.h"
#include "TFT/Arial12x12.h"
#include "TFT/Arial24x23.h"
#include "TFT/font_big.h"

DigitalOut LCD_LED(P0_2);

SPI_TFT_ILI9341 TFT(P0_9, P0_8, P0_7, P0_6, P0_0, P0_1,
" TFT");

AnalogOut Aout(P0_26);
AnalogIn Ain(P1_31);
float ADCdata;
float i;

int main() {

    LCD_LED =1;

    TFT.background(White);
    TFT.foreground(Black);

    while(1){
        ADCdata = Ain;
        Aout = ADCdata;
        float temp = (((ADCdata*3.335) - 0.5) /0.01);
        TFT.set_orientation(1);
        TFT.set_font((unsigned char*)Arial24x23);
        TFT.locate(80,100);
        TFT.cls();
        TFT.printf("%.2f  Deg C", temp);
        wait(1);

    }

}
```