GRAFIK SUHU KELEMBABAN DG LCD NOKIA 5110

Sistem Kerja Alat:

Arduino UNO membaca suhu dan kelembaban dengan sensor suhu DS1820 serta DHT11 dan hasilnya ditampilkan ke LCD Nokia tipe 5110 dengan tampilan nilai dan grafik batang. Jenis LCD ini seperti yang dipakai tampilan pada HP Nokia 5110. Betul, HP jaman jadul... Nah pada proyek ini kita akan membuat interfacing antara LCD Nokia dengan Arduino. Harganya relatif murah, tidak sampai 100 ribu. Komunikasinya juga tidak terlalu sulit karena didukung oleh pin SPI (*Serial Peripheral Interface*).
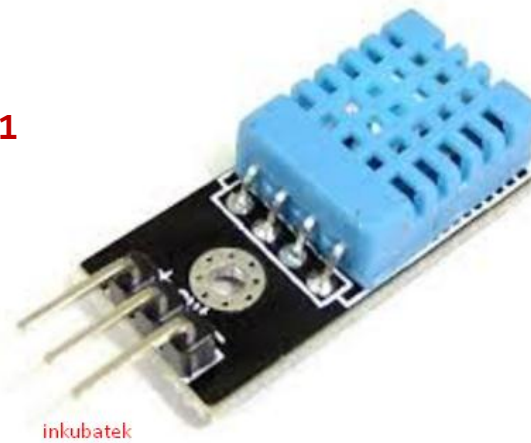
Spesifikasi dasar LCD Nokia 5110 :

- Ukuran 84*48
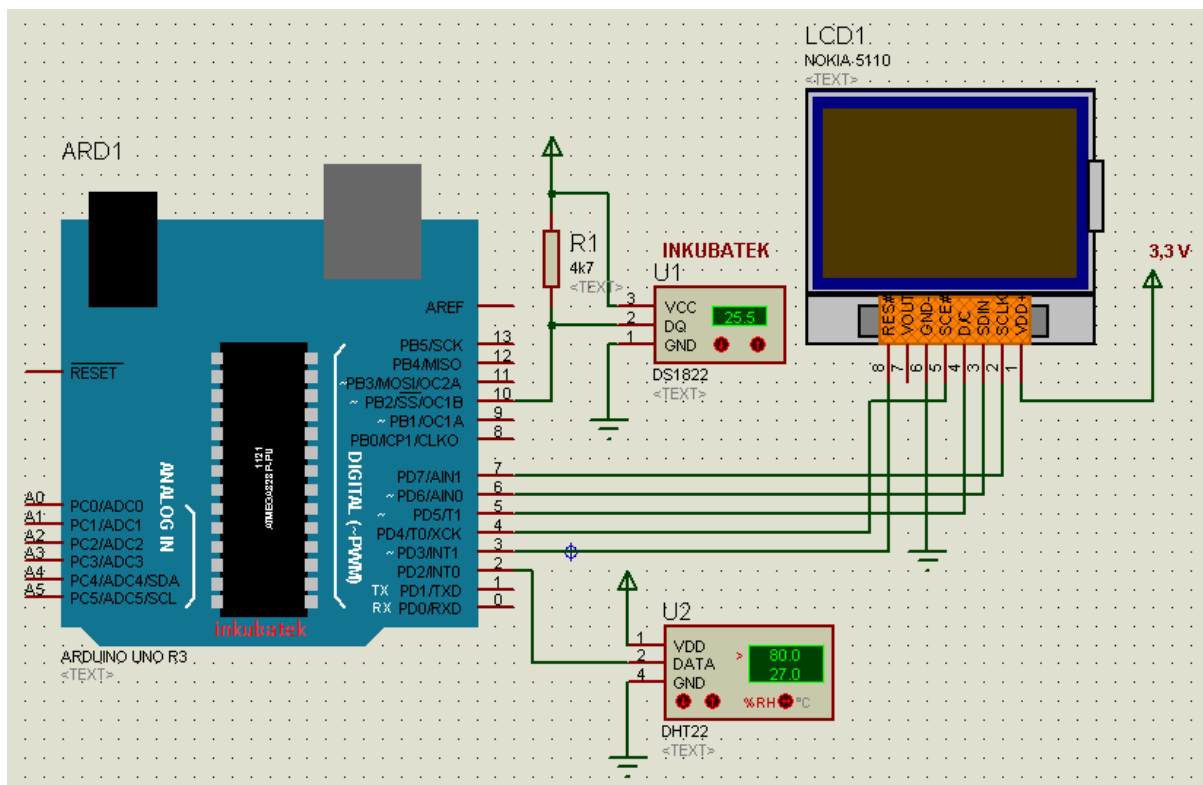- Tegangan 3,3 V
- Controller : PCD8544

Kebutuhan Hardware :

- Arduino UNO Board
- Modul LCD Nokia 5110
- Sensor DHT11
- Sensor suhu DS1820
- Power Supply 7-9 Vdc

Modul LCD Nokia 5110

inkubatek

RST CE DC Din Clk Vcc BL Gnd

DS1820/22

Waterproof DS1820/22

INKUBATEK

DHT11

Schematics

Koneksi standar modul NOKIA 5110 dengan ARDUINO :

Pin ARDUINO	Modul LCD NOKIA 5110
3.3 V	VCC
5V	BL
GND	GND

3	1 (RST)
4	2 (CE / CS)
5	3 (DC)
6	4 (DIN)
7	5 (CLK/SCK)

Koneksi Arduino dengan Sensor DS1820 :

Pin ARDUINO	**MAX6675**
5 V	VCC
GND	GND
10	OUT

Koneksi Arduino dengan Sensor DHT11 :

Pin ARDUINO	**MAX6675**
5 V	VCC
GND	GND
2	OUT

Source Code/Sketch :

```
/***********************************

 * Program : Project

 * Input   : Sensor DHT11, DS1820

 * Output  : LCD Nokia 5110

 * 125 Proyek Arduino Inkubatek
```

```
 * www.tokotronik.com

 * *******************************/


//Celsius to Fahrenheit conversion

double Fahrenheit(double celsius)

{

  return 1.8 * celsius + 32;

}


//Celsius to Kelvin conversion

double Kelvin(double celsius)

{

  return celsius + 273.15;

}


double dewPoint(double celsius, double humidity)

{

  double RATIO = 373.15 / (273.15 + celsius);  // RATIO was originally named A0, possibly confusing in Arduino context

  double SUM = -7.90298 * (RATIO - 1);

  SUM += 5.02808 * log10(RATIO);

  SUM += -1.3816e-7 * (pow(10, (11.344 * (1 - 1/RATIO ))) - 1) ;

  SUM += 8.1328e-3 * (pow(10, (-3.49149 * (RATIO - 1))) - 1) ;

  SUM += log10(1013.246);

  double VP = pow(10, SUM - 3) * humidity;

  double T = log(VP/0.61078);   // temp var

  return (241.88 * T) / (17.558 - T);

}


// delta max = 0.6544 wrt dewPoint()
```

```
// 5x faster than dewPoint()

// reference: http://en.wikipedia.org/wiki/Dew_point

double dewPointFast(double celsius, double humidity)

{

    double a = 17.271;

    double b = 237.7;

    double temp = (a * celsius) / (b + celsius) + log(humidity/100);

    double Td = (b * temp) / (a - temp);

    return Td;

}


#include <dht11.h>

dht11 DHT11;

#define DHT11PIN 2

#include <OneWire.h>

#include <DallasTemperature.h>

// Data wire is plugged into port 2 on the Arduino

#define ONE_WIRE_BUS 10

// Setup a oneWire instance to communicate with any OneWire devices (not just Maxim/Dallas
temperature ICs)

OneWire oneWire(ONE_WIRE_BUS);

// Pass our oneWire reference to Dallas Temperature.

DallasTemperature sensors(&oneWire);

#include <Adafruit_GFX.h>

#include <Adafruit_PCD8544.h>

// pin 7 - Serial clock out (SCLK)

// pin 6 - Serial data out (DIN)

// pin 5 - Data/Command select (D/C)

// pin 4 - LCD chip select (CS)

// pin 3 - LCD reset (RST)
```

```
Adafruit_PCD8544 display = Adafruit_PCD8544(7, 6, 5, 4, 3);

#define Backlight_Pin 9

void setup()

{

  // DS18B20

  sensors.begin();


  // Nokia 5110 display

  display.begin();

  display.setContrast(50);

  pinMode(Backlight_Pin, OUTPUT);

  pinMode(0, INPUT);

  display.clearDisplay();

  display.setTextSize(1);

  display.setTextColor(BLACK);

  display.setCursor(0,0);

  display.println("Ready");

  display.display();

}


float dht11_temperature = 0;

float dht11_humidity = 0;

float ds18b20_temperature = 0;

#define TEMP_SIZE LCDWIDTH

float temp[TEMP_SIZE] = {0.0};

int temp_pos = 0; // position in circular buffer above


void loop()

{

  int chk = DHT11.read(DHT11PIN);
```

```
switch (chk)

{

  case DHTLIB_OK:

  break;

  case DHTLIB_ERROR_CHECKSUM:

  break;

  case DHTLIB_ERROR_TIMEOUT:

  break;

  default:

  break;

}


dht11_humidity = (float)DHT11.humidity;

dht11_temperature = (float)DHT11.temperature;

sensors.requestTemperatures(); // Send the command to get temperatures

sensors.requestTemperatures(); // Send the command to get temperatures

ds18b20_temperature = sensors.getTempCByIndex(0);

temp[temp_pos] = ds18b20_temperature;

display.clearDisplay();

display.setCursor(0,0);

display.print(dht11_temperature, 0);

display.print("C ");

display.print(dht11_humidity, 0);

display.print("% ");

display.print(ds18b20_temperature, 2);

display.print("C");

float min = temp[0], max = temp[0];

for(int i = 0; i < TEMP_SIZE; i++) {

  if (temp[i] < min && temp[i] > 0) min = temp[i];

  if (temp[i] > max) max = temp[i];
```

```
    }


    // draw right to left so most recent value is on the right

    for(int x = TEMP_SIZE - 1; x >= 0; x--) {

      int pos = ( x + temp_pos + 1 ) % TEMP_SIZE;

      if ( temp[pos] > 0 ) {

        int y = ( ( temp[pos] - min ) / ( max - min ) ) * ( LCDHEIGHT - 10 );

        display.drawLine(x, LCDHEIGHT - y, x, LCDHEIGHT, BLACK);


      }
    }
     // refresh LCD

    display.display();

    // pulse display backlight

    int backlight = 0;

    float old_temp = temp[(temp_pos + TEMP_SIZE - 1) % TEMP_SIZE];

    if ( ds18b20_temperature < old_temp ) {

      backlight = 32;

    } else if ( ds18b20_temperature > old_temp ) {

      backlight = 255;

    }

    analogWrite(Backlight_Pin, backlight);

    delay(2000);

    if ( ++temp_pos > TEMP_SIZE ) temp_pos = 0;

  }
```

Jalannya Alat :

Pada LCD akan tampil nilai suhu dan kelembaban serta tampilan dalam bentuk grafik.

 "Thermocouple:"

Kemudian menampilkan nilai suhu/temperatur yang diukur oleh sensor.

"31.76"

"Celcius"