3 CH SENSOR SUHU DS1820, LM35 & THERMOCOUPLE

Sistem Kerja Alat:

Arduino UNO membaca nilai temperatur linkungan dengan 3 sensor suhu jenis DS1820/22, LM35 dan Thermocouple . Hasil pembacaan kedua sensor ditampilkan ke Serial Monitor.

Kebutuhan Hardware :

- Arduino UNO Board
- Modul sensor temperatur DS182/22
- Modul sensor LM35
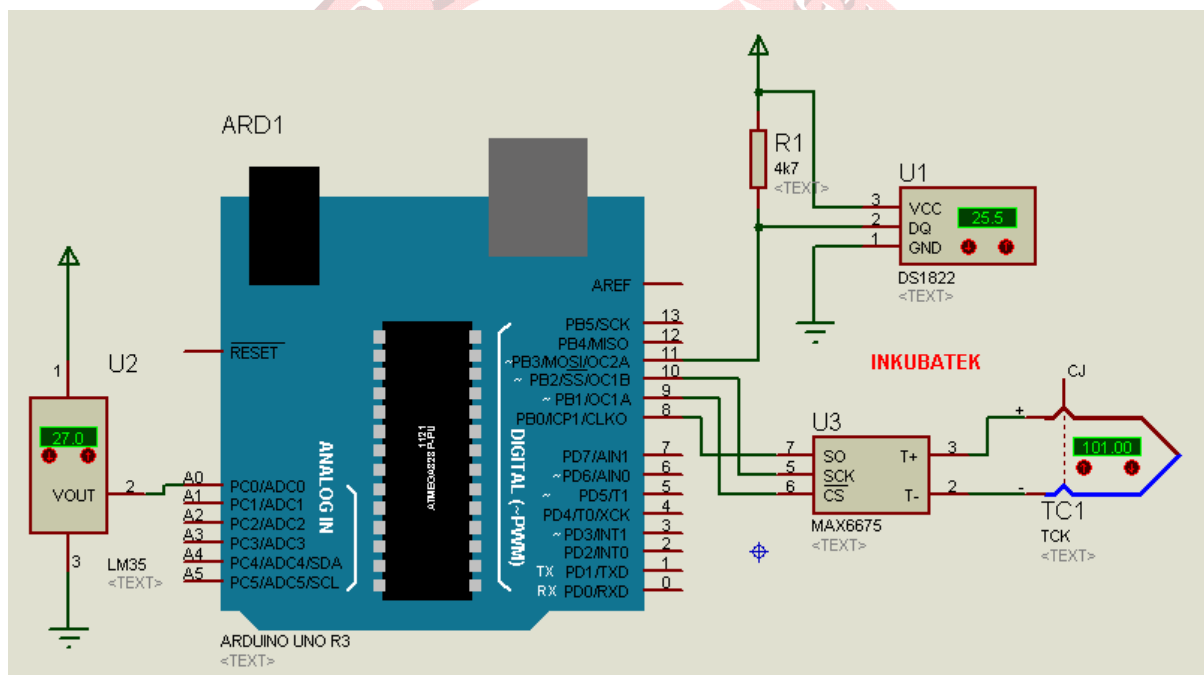- Modul Sensor Thermocouple dg driver MAX6675
- Power Supply 7-9 Vdc

DS1820/22

Waterproof DS1820/22

Thermocouple & MAX675

Schematics

Koneksi Arduino dengan Sensor DS1820/22 :

Pin ARDUINO	Sensor DS1820
5 V	5 V (red)
GND	GND (grey)
11	Data (yellow)

Koneksi Arduino dengan Sensor Thermocouple (Driver max6675) :

Pin ARDUINO	MAX6675
5 V	VCC
GND	GND
8	S0
9	CS
10	SCK

Koneksi Arduino dengan Sensor LM35 :

Pin ARDUINO	Sensor LM35
5 V	5 V
GND	GND
A0	Analog Sensor Out

Source Code/Sketch :

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

 * Program : Project 2 3 Ch Sensor Suhu DS1820 LM35 TC

 * Input   : Sensor LM35 di pin A0

 *        Sensor DS1820

 *        Sensor Thermocouple (MAX6675)

 *          SO  --> PIN 8

 *          SCK --> PIN 10

 *          CS --> PIN 9

 * Output  : Serial Monitor

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

#include <OneWire.h>
```

```
#include <Wire.h>

#include "max6675.h"


OneWire  ds(11);  // on pin 11 --DS1820

int thermoDO = 8;

int thermoCS = 9;

int thermoCLK = 10;

unsigned int adc,tempDS,tempLM,tempTC;

MAX6675 thermocouple(thermoCLK, thermoCS, thermoDO);


//======================================

void setup(void) {

  Serial.begin(9600);

  Serial.println("Monitoring 3 Sensor Suhu : DS1820, Thermocouple, LM35");


}
//======================================

void loop(void) {

  byte i;

  byte present = 0;

  byte type_s;

  byte data[12];

  byte addr[8];

  float celsius, fahrenheit;

  //===============================


  if ( !ds.search(addr)) {

   ds.reset_search();

   delay(250);

   return;
```

```
  }
  // the first ROM byte indicates which chip
  switch (addr[0]) {
  case 0x10: //  Chip = DS18S20 or old DS1820
    type_s = 1;
    break;
  case 0x28: //  Chip = DS18B20
    type_s = 0;
    break;
  case 0x22: //  Chip = DS1822
    type_s = 0;
    break;
  default:  //Device is not a DS18x20 family device.
    return;
  }


  ds.reset();
  ds.select(addr);
  ds.write(0x44, 1);        // start conversion, with parasite power on at the end


  delay(1000);     // maybe 750ms is enough, maybe not
  // we might do a ds.depower() here, but the reset will take care of it.


  present = ds.reset();
  ds.select(addr);
  ds.write(0xBE);         // Read Scratchpad


  for ( i = 0; i < 9; i++) {          // we need 9 bytes
    data[i] = ds.read();
  }
```

```
int16_t raw = (data[1] << 8) | data[0];

if (type_s) {

  raw = raw << 3; // 9 bit resolution default

  if (data[7] == 0x10) {

    raw = (raw & 0xFFF0) + 12 - data[6];

  }

}

else {

  byte cfg = (data[4] & 0x60);

  if (cfg == 0x00) raw = raw & ~7;  // 9 bit resolution, 93.75 ms

  else if (cfg == 0x20) raw = raw & ~3; // 10 bit res, 187.5 ms

  else if (cfg == 0x40) raw = raw & ~1; // 11 bit res, 375 ms

}

celsius = (float)raw / 16.0;

fahrenheit = celsius * 1.8 + 32.0;

tempDS=celsius;

//==================

adc = analogRead(0);

tempLM=(adc*5)/10;

//==================

celsius=thermocouple.readCelsius();

tempTC=celsius;


Serial.print("Temp DS1820=");

Serial.print(tempDS);

Serial.println(" Celcius");

Serial.print("Temp Thermocouple=");

Serial.print(tempTC);

Serial.println(" Celcius");

Serial.print("Temp LM35=");
```

```
Serial.print(tempLM);

Serial.println(" Celcius");

delay(1000);

}
```

Jalannya Alat :

Jalankan Serial Monitor (dari menu *Tool – Serial Monitor*) set baud rate pada nilai 9600 bps. Pada Serial Monitor akan tampil nilai temperature yang dibaca oleh Arduino dengan sensor suhu DS1820 , LM35 dan Thermocouple. Jika temperatur berubah, tampilan di Serial Monitor akan mengikutinya.