3 in 1 Temperature Sensor Shield For Arduino Nano

The 3 In one shield for Arduino Nano helps to develop various temperature measuring applications. Arduino Nano shield consist 3 different types of temperature sensors.

1. MLX90614 non-contact temperature sensor
2. 10K NTC Analogue Temperature Sensor
3. Programmable Resolution 1-Wire Digital Thermometer

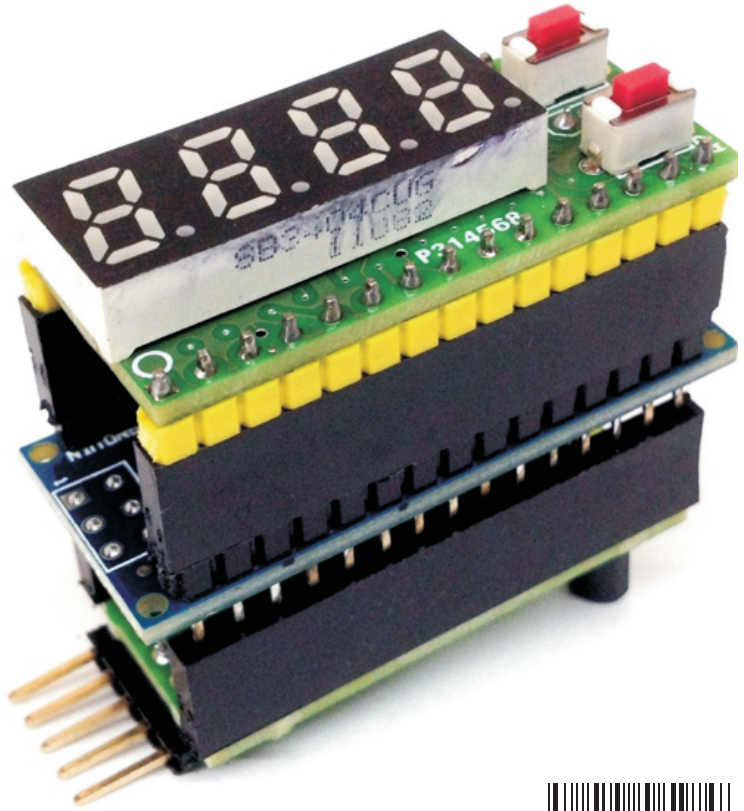
It's easy to make contactless temperature meter using this shield and earlier published 4 Digit display Nano shield,

http://www.electronics-lab.com/project/4-digit-7-segment-display-shield-arduino-nano/

Note : Only MLX90614 sensor can be used with display shield , DS18200 and NTC has to be abandon as display uses those port pins.

Features

- Supply 5V DC
- Temperature Range -20 to 120 Degrees Centigrade
- Output Resolution 0.14 Degrees Centigrade
- SPI Interface Connected to Arduino Nano A5-SCL and A4-SDA Pins



MLX90614

The MLX90614 is an infrared thermometer for non-contact temperature measurements. Both the IR sensitive thermopile detector chip and the signal conditioning ASIC are integrated in the same TO-39 can. Integrated into the MLX90614 are a low noise amplifier, 17-bit ADC and powerful DSP unit thus achieving high accuracy and resolution of the thermometer. The thermometer comes factory calibrated with a digital SMBus output giving full access to the measured temperature in the complete temperature range(s) with a resolution of 0.02°C. The user can configure the digital output to be pulse width modulation (PWM). As a standard, the 10-bit PWM is configured to continuously transmit the measured temperature in range of -20 to 120°C, with an output resolution of 0.14°C.

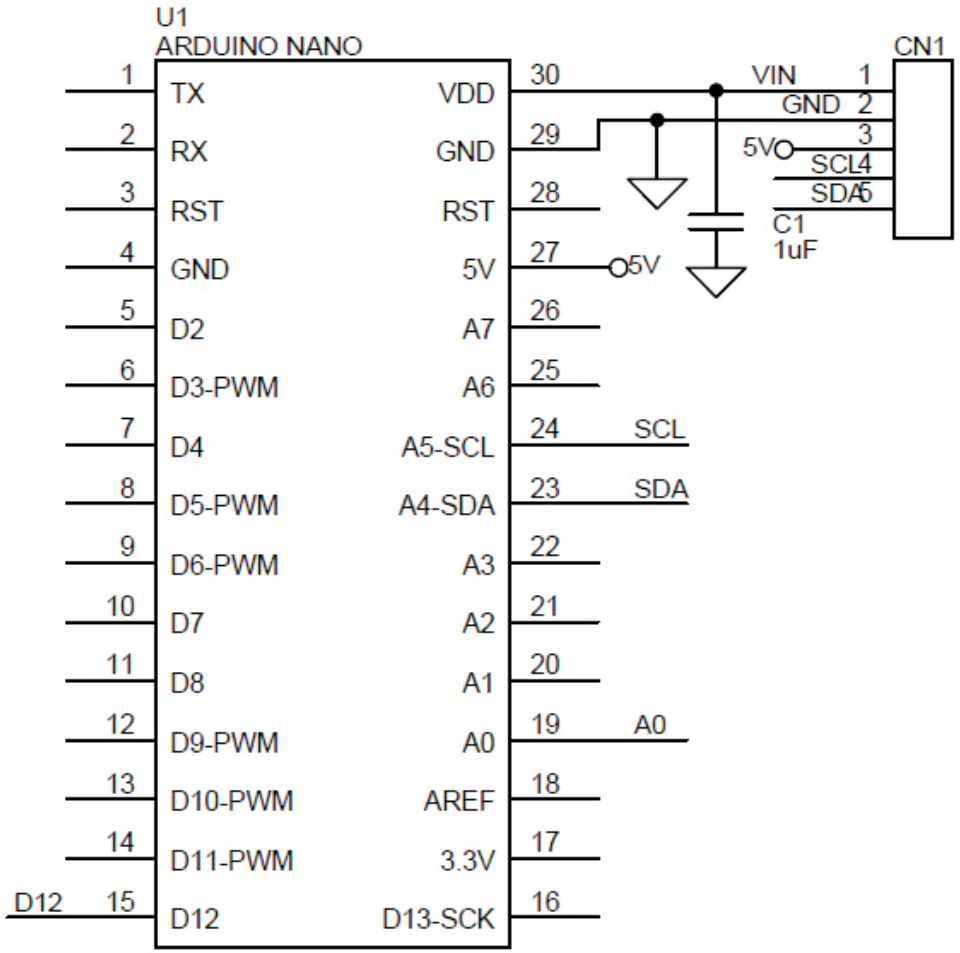
DS18B20

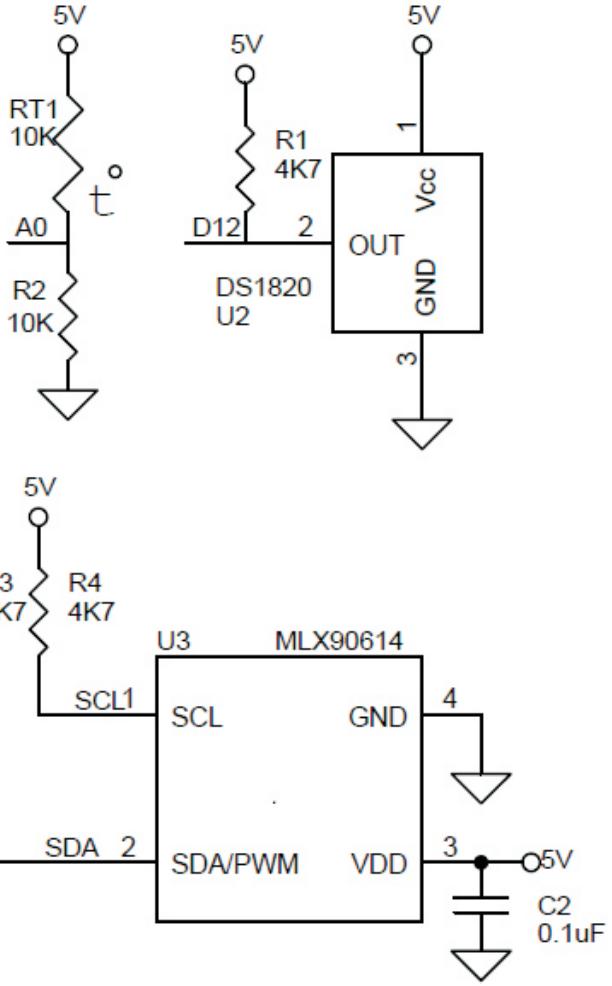
The DS18B20 digital thermometer provides 9-bit to 12-bit Celsius temperature measurements and has an alarm function with nonvolatile user-programmable upper and lower trigger points. The DS18B20 communicates over a 1-Wire bus that by definition requires only one data line (and ground) for communication with a central microprocessor. In addition, the DS18B20 can derive power directly from the data line ("parasite power"), eliminating the need for an external power supply. Each DS18B20 has a unique 64-bit serial code, which allows multiple DS18B20s to function on the same 1-Wire bus. Thus, it is simple to use one microprocessor to control many DS18B20s distributed over a large area. Applications that can benefit from this feature include HVAC environmental controls, temperature monitoring systems inside buildings, equipment, or machinery, and process monitoring and control systems.

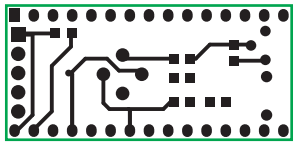
- Measures Temperatures from -55°C to +125°C (-67°F to +257°F)
- ±0.5°C Accuracy from -10°C to +85°C
- Programmable Resolution from 9 Bits to 12 Bits
- Supply 5V DC
- Output Data pin Connected to Digital Pin D12 of the Arduino Nano

NTC 10K with 10 K Divider Resistors

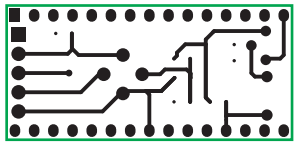
NTC stands for “Negative Temperature Coefficient”. NTC thermistors are resistors with a negative temperature coefficient, which means that the resistance decreases with increasing temperature. Thermistors are low cost accurate components can be used as temperature sensing device for various applications. The NTC is connected to Analog A0 of Arduino Nano pin with 10k divider Resistor.
Arduino interface examples can be find here
https://playground.arduino.cc/ComponentLib/Thermistor
https://playground.arduino.cc/ComponentLib/Thermistor2


U1
ARDUINO NANO
TX
RX
RST
GND
D2
D3-PWM
D4
D5-PWM
D6-PWM
D7
D8
D9-PWM
D10-PWM
D11-PWM
D12
VDD
GND
RST
5V
A7
A6
A5-SCL
A4-SDA
A3
A2
A1
A0
AREF
3.3V
D13-SCK
CN1
VIN
GND
5V
SCL
SDA
C1
1uF
SCL
SDA
A0

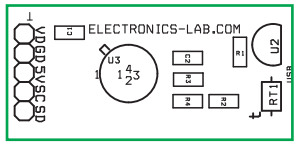

5V
RT1
10K
A0
R2
10K
5V
R1
4K7
D12
DS1820
U2
OUT
Vcc
GND
5V
5V
R3
4K7
R4
4K7
U3
MLX90614
SCL1
SCL
GND
SDA 2
SDA/PWM
VDD
5V
C2
0.1uF



TOP

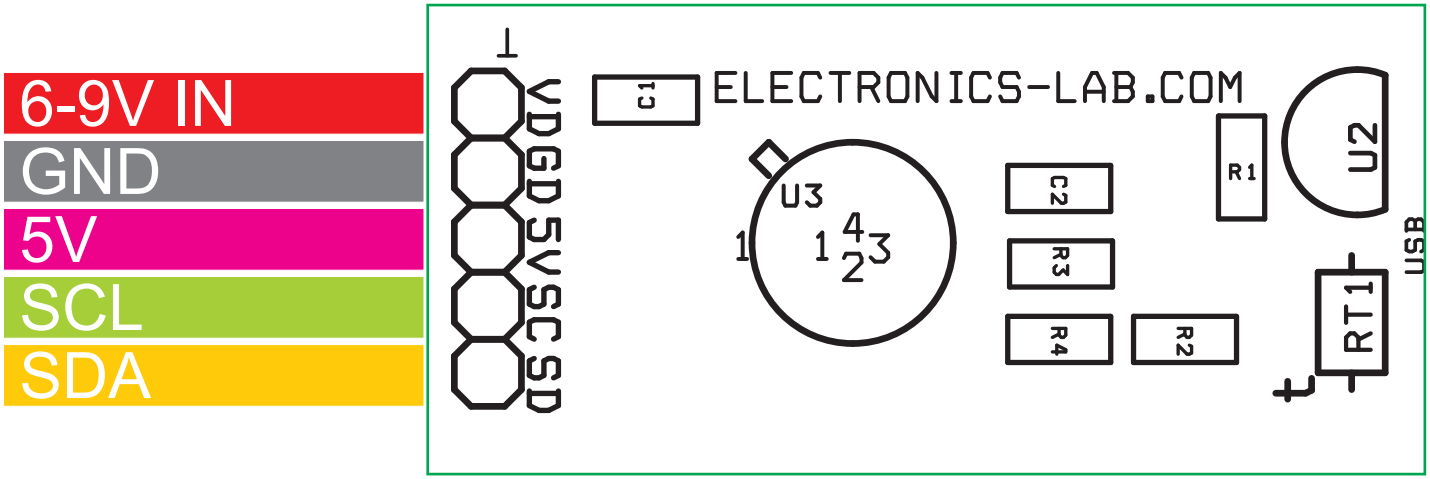


BOTTOM



SILK SCREEN TOP

BOM			
SR.	***QNTY.***	***REF.***	***DESC.***
1	1	CN1	5 PIN HEADER CONNECTOR
2	1	C1	1uF SMD 0805
3	1	C2	0.1uF SMD 0805
4	2	RT1,R2	10K SMD 0805
5	3	R1,R3,R4	4K7 SMD 0805
6	1	U1	ARDUINO NANO
7	1	U2	DS1820 TO92
8	1	U3	MLX90614



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