

Infrared Thermometer

(MLX90614)

PHYS 398 FA18

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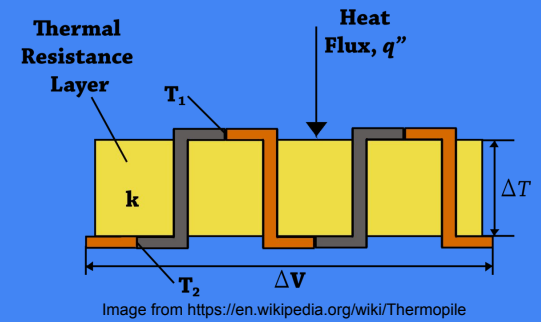


Overview



- Simple thermometer used for non-contact temperature measurement
- Able to measure temperature from -70°C to 380°C
- 0.02°C resolution, and $\pm 0.5^{\circ}\text{C}$ accuracy around room temperature

How It Works

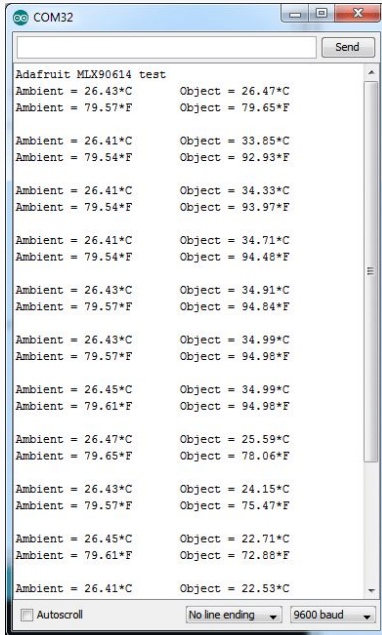


- Objects above 0°K radiates light, objects near room temperature radiates waves in the infrared region
- The thermometer collects light signals and focus them onto thermopiles. The thermopile then produces voltage proportional to a local temperature difference.

How to Use it

- The thermometer has a cone shaped 90° field of view.
- The object being measured needs to be placed inside the thermometer's field of view.
- Since its FOV is cone shaped, the sensing area gets increasingly wider as the distance increases
- Also measures its own temperature (-40°C - 125°C measuring range), which can be used to further calibrate data.

Code support



The screenshot shows a terminal window titled 'COM32' with a 'Send' button at the top. The output text is as follows:

```
Adafruit MLX90614 test
Ambient = 26.43°C   Object = 26.47°C
Ambient = 79.57°F   Object = 79.65°F

Ambient = 26.41°C   Object = 33.85°C
Ambient = 79.54°F   Object = 92.93°F

Ambient = 26.41°C   Object = 34.33°C
Ambient = 79.54°F   Object = 93.97°F

Ambient = 26.41°C   Object = 34.71°C
Ambient = 79.54°F   Object = 94.48°F

Ambient = 26.43°C   Object = 34.91°C
Ambient = 79.57°F   Object = 94.84°F

Ambient = 26.43°C   Object = 34.99°C
Ambient = 79.57°F   Object = 94.98°F

Ambient = 26.45°C   Object = 34.99°C
Ambient = 79.61°F   Object = 94.98°F

Ambient = 26.47°C   Object = 25.59°C
Ambient = 79.65°F   Object = 78.06°F

Ambient = 26.43°C   Object = 24.15°C
Ambient = 79.57°F   Object = 75.47°F

Ambient = 26.45°C   Object = 22.71°C
Ambient = 79.61°F   Object = 72.88°F

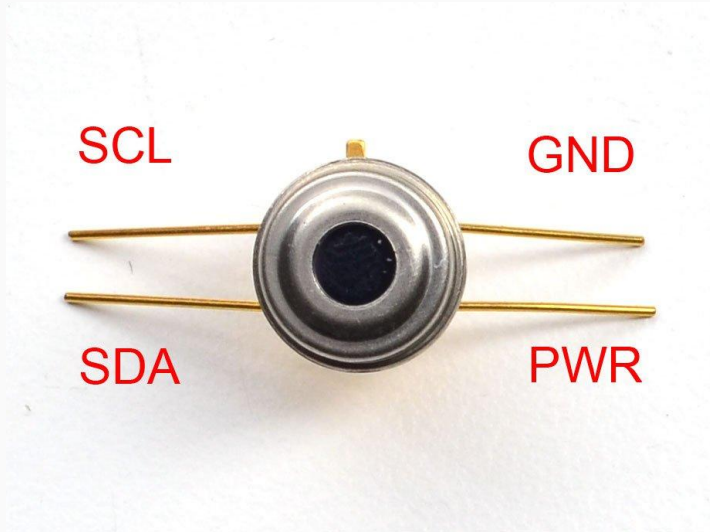
Ambient = 26.41°C   Object = 22.53°C
```

At the bottom of the window, there are settings: Autoscroll, No line ending, and 9600 baud.

<https://github.com/adafruit/Adafruit-MLX90614-Library>

- Code in C++
- Note that ambient temperature is the temperature of the sensor itself.

Wiring



- Connect GND to common power/data ground
- Connect PWR to the power supply
- Connect the SDA pin to the I2C data SDA pin on Arduino
- Connect the SCL pin to the I2C clock SCL pin on Arduino

Sources

<https://learn.sparkfun.com/tutorials/mlx90614-ir-thermometer-hookup-guide>

<https://www.adafruit.com/product/1748>

<https://learn.adafruit.com/using-melexis-mlx90614-non-contact-sensors/wiring-and-test>

<https://en.wikipedia.org/wiki/Thermopile>