

Infrared sensor module

The infrared sensor mote can be used to measure the temperature of an object by infrared radiation. The infrared module from Melexis (MLX90601KZA-BKA) can sense temperatures between -20C and 120C with a precision of +- 2C. Because the infrared module takes in a 5 volt regulated supply, the board contains a 5V voltage regulator. To properly power the regulator, its input must be at least 6V. The board also contains additional circuitry to switch off power to the infrared module when it is not active.

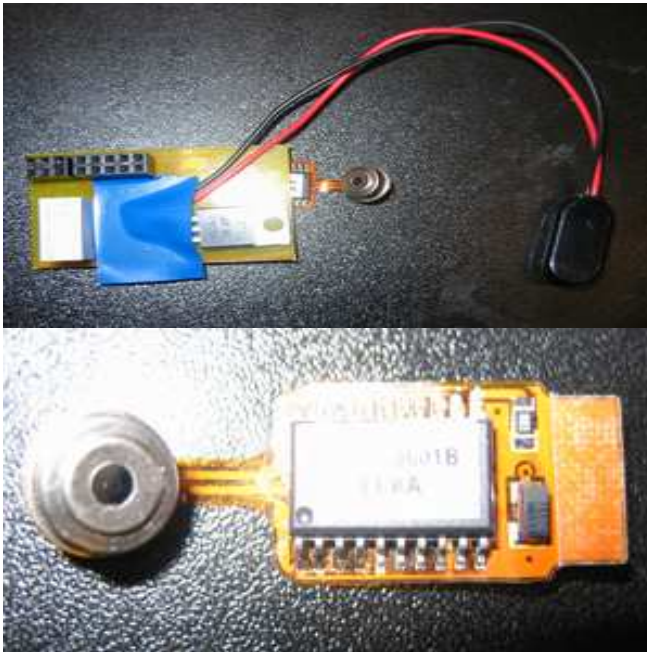


Figure 1 Top: IR sensor module. Bottom: IR sensor

Infrared sensor module output

The output of the module can be plugged into a separate Telos mote using a sub-mini mono jack. The inside conductor is the signal while the outside conductor is ground. The output signal is an analog signal that follows the conversion formula:

$$\text{Temperature} = \text{Volt_ir} / 4.5 * 140 - 20$$

When hooked up to an ADC mote on the Telos,

$$\text{Temperature} = \text{ADCvalue} * 2.5 / 4095 / 4.5 * 140 - 20$$

Power

A standard 9V cell contains approximately 230mAh of energy. Three 3V 2016 lithium cells contain approximately 75mAh of energy. The IR sensor uses approximately 6mA of current when it is turned on. This means, with 100% duty cycle, the 2016 cell can only last 12.5 hours while the standard 9V cell can last approximately 38 hours. Note, when modulating the power to the IR sensor, a minimum of ~700ms power-on time is needed for the sensor to properly warm up and output correct values.