

I-CUBE**X**

Sensors & Interfaces

Software

Support

MoveAround

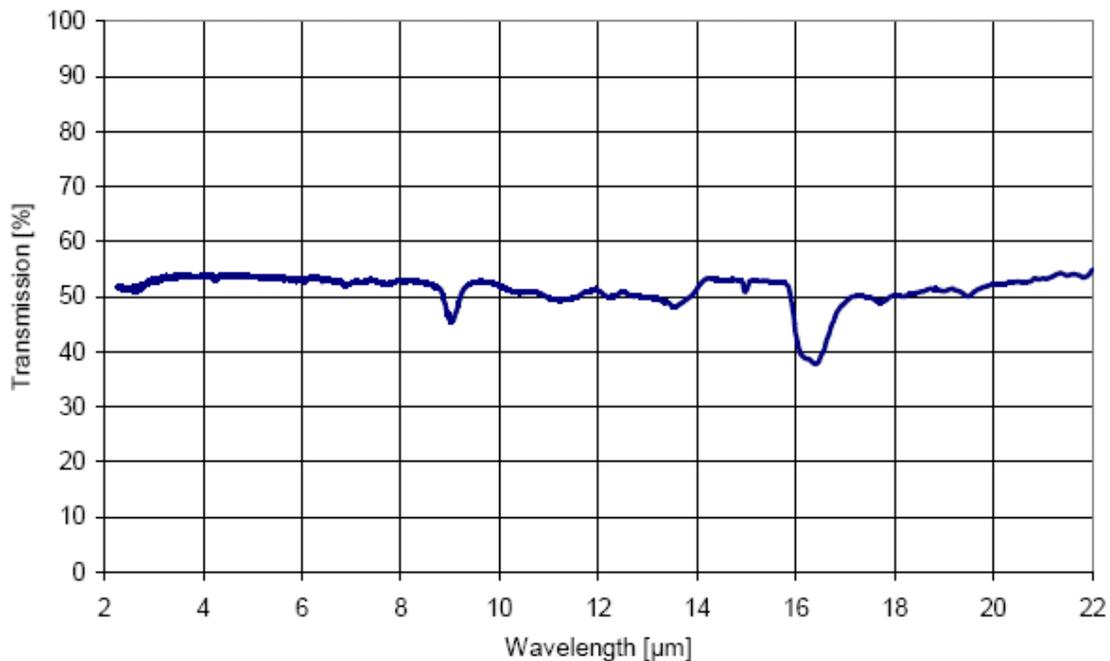
Technical Specification

Introduction

The MoveAround is a thermopile array detecting infra-red in the 2 μ m-22 μ m range. This is the wavelength of radiant heat. The Pyro-electric sensors that are used commonly in burglar alarms and to switch on outside lights, detect infra-red in the same waveband. These Pyro-electric sensors can only detect a change in heat levels though - hence they are movement detectors. Although useful in robotics, their applications are limited as they are unable to detect and measure the temperature of a static heat source. Another type of sensor is the thermopile array. These are used in non-contact infra-red thermometers. They have a very wide detection angle or field of view (FOV) of around 100° and need either shrouding or a lens or commonly both to get a more useful FOV of around 12°. Some have a built in lens. More recently sensors with an array of thermopiles, built in electronics and a silicon lens have become available. This is the type used in the MoveAround. It has an array of eight thermopiles arranged in a row. The MoveAround can measure the temperature of 8 adjacent points simultaneously. The MoveAround can detect a candle flame at a range 2 metres (6ft) and is unaffected by ambient light!

Spectral Response

The response of the MoveAround is typically 2 μ m to 22 μ m and is shown below:



Field of View (FOV)

The typical field of view of the MoveAround is 41° by 6° making each of the eight pixels 5.12° by 6°. The array of eight pixels is orientated along the length of the sensor. Pixel number one is nearest

the tab on the sensor.

Sensitivity

For a candle, the numbers for each of the eight pixels at a range of 1 meter in a cool room at 12°C are: 11 10 11 12 12 29 15 13 (All °C)

You can see the candle showing up as the 29°C reading. At a range of 2 meters this reduces to 20°C - still around 8°C above ambient and easily detectable. At 0.6 meter (2ft) its around 64°C. At 0.3 meter (1ft) its 100°C+.

In a warmer room at 18°C, the candle measures 27°C at 2 meters. This is because the candle only occupies a small part of the sensors field of view and the candles point heat source is added to the back ground ambient - not swamped by it. A human at 2 meters will show up as around 29°C with a background 20°C ambient.

Registers

The MoveAround appears as a set of 10 registers.

Register	Read	Write
0	Software Revision	Command Register
1	Ambient Temperature °C	N/A
2	Pixel 1 Temperature °C	N/A
3	Pixel 2	N/A
4	Pixel 3	N/A
5	Pixel 4	N/A
6	Pixel 5	N/A
7	Pixel 6	N/A
8	Pixel 7	N/A
9	Pixel 8	N/A

Only registers 0, and 1 can be written to. Register 0 is the command register and is used to set the servo position and also when changing the MoveAround's I2C address. It cannot be read. Reading from register 0 returns the MoveAround software revision. Reading register 1 reads the ambient temperature.

There are 9 temperature readings available, all in degrees centigrade (°C). Register 1 is the ambient temperature as measured within the sensor. Registers 2-9 are the 8 pixel temperatures. Temperature acquisition is continuously performed and the readings will be correct approx 40mS after the sensor points to a new position.

Changing the I2C Bus Address

To change the I2C address of the MoveAround you must have only one sensor on the I2C bus. Write the 3 sequence commands in the correct order followed by the address. Example; to change the

