

I-CUBEX

• *Sensors & Interfaces* •

Software •

Support

MoveAround

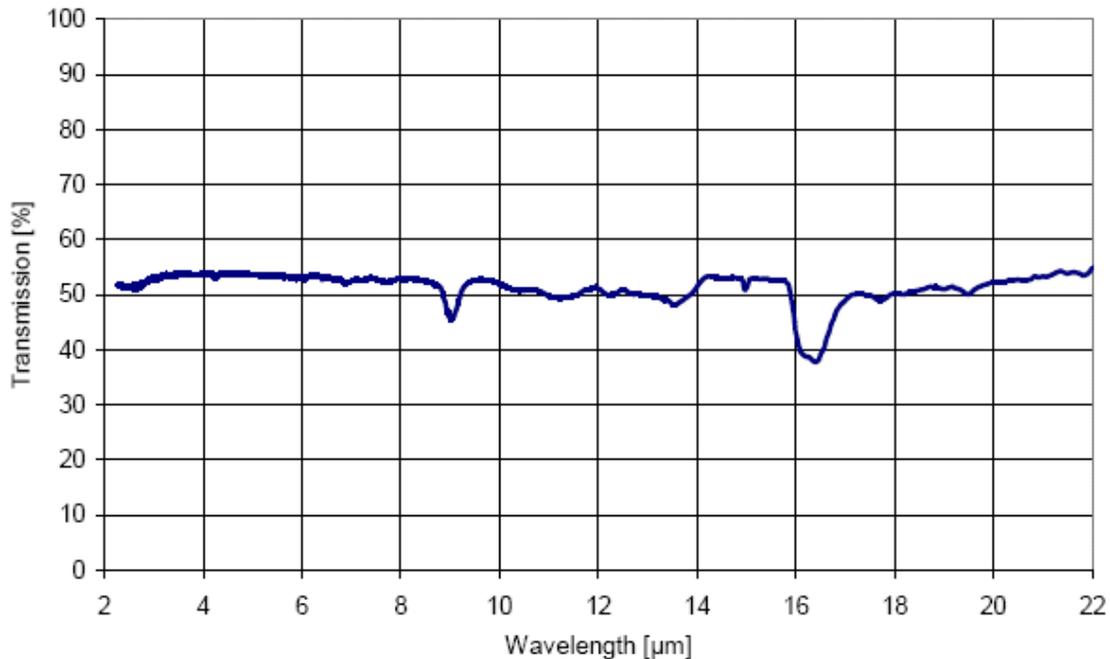
Technical Specification

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

address of a MoveAround currently at 0xD0 (the default shipped address) to 0xD2, write the following to address 0xD0; (0xA0, 0xAA, 0xA5, 0xD2). These commands must be sent in the correct sequence to change the I2C address, additionally, No other command may be issued in the middle of the sequence. The sequence must be sent to the command register at location 0, which means 4 separate write transactions on the I2C bus. Additionally, there MUST be a delay of at least 50uS between the writing of each byte of the address change sequence. When done, you should label the sensor with its address, if you lose track of the module addresses, the only way to find out what it is to search all the addresses one at a time and see which one responds. The MoveAround can be set to any of eight I2C addresses - 0xD0, 0xD2, 0xD4, 0xD6, 0xD8, 0xDA, 0xDC, 0xDE. The factory default shipped address is 0xD0.

Mechanical Layout

