I2C address translation

This document will hold a table with XOR configurations and their output.

Since each sensor has the same 4 starting addresses the output is defined as the starting address XOR the translation byte.

In order to find out which settings we can and cannot use we need to take the following into account:

* There should be no conflicts in the entire system
* The minimum address is 0x03 for the Raspberry (you can find this by doing the command “sudo i2cdetect -y 1” from the raspberry terminal)
* The maximum address should not exceed 0x77 (again found by doing the command in the terminal)

The maximum address is 0x77 due to 3 reasons.

1. The i2c addresses of the sensors are 7 bit addresses.
2. An i2c address that starts with 111 10xx defines that the address is a 10 bit address
3. An i2c address that starts with 111 11xx is set apart for future purposes

We want as many possible configurations to get a high number of sensors.

At the end of this document is a table with all the values for the XOR translation byte followed by the corresponding addresses. The discussion of these results will take place here since it is not handy to go through all of these tables. I have added the table for completeness.

The lines in the table that are strike through are lines that do not meet the above set of requirements. An X at the end means at least one value is below the minimum and an Y means that at least one value is above the maximum

After taking this into account we are left with a total of 80 different combinations. It makes sense that some if not most of these will cause conflicts with others.

In order to generate as many combinations a computer algorithm will be defined.

XOR |Accel |Gyro\_ |Magnet |Pressure  
0000000|1010011|1101001|0011110|1110111  
0000001|1010010|1101000|0011111|1110110  
0000010|1010001|1101011|0011100|1110101  
0000011|1010000|1101010|0011101|1110100  
0000100|1010111|1101101|0011010|1110011  
0000101|1010110|1101100|0011011|1110010  
0000110|1010101|1101111|0011000|1110001  
0000111|1010100|1101110|0011001|1110000 ~~0001000|1011011|1100001|0010110|1111111Y  
0001001|1011010|1100000|0010111|1111110Y  
0001010|1011001|1100011|0010100|1111101Y  
0001011|1011000|1100010|0010101|1111100Y  
0001100|1011111|1100101|0010010|1111011Y  
0001101|1011110|1100100|0010011|1111010Y  
0001110|1011101|1100111|0010000|1111001Y  
0001111|1011100|1100110|0010001|1111000Y  
0010000|1000011|1111001|0001110|1100111Y  
0010001|1000010|1111000|0001111|1100110Y  
0010010|1000001|1111011|0001100|1100101Y  
0010011|1000000|1111010|0001101|1100100Y  
0010100|1000111|1111101|0001010|1100011Y  
0010101|1000110|1111100|0001011|1100010Y  
0010110|1000101|1111111|0001000|1100001Y  
0010111|1000100|1111110|0001001|1100000Y~~  
0011000|1001011|1110001|0000110|1101111  
0011001|1001010|1110000|0000111|1101110  
0011010|1001001|1110011|0000100|1101101  
0011011|1001000|1110010|0000101|1101100 ~~0011100|1001111|1110101|0000010|1101011X  
0011101|1001110|1110100|0000011|1101010X  
0011110|1001101|1110111|0000000|1101001X  
0011111|1001100|1110110|0000001|1101000X~~  
0100000|1110011|1001001|0111110|1010111  
0100001|1110010|1001000|0111111|1010110  
0100010|1110001|1001011|0111100|1010101  
0100011|1110000|1001010|0111101|1010100  
0100100|1110111|1001101|0111010|1010011  
0100101|1110110|1001100|0111011|1010010  
0100110|1110101|1001111|0111000|1010001  
0100111|1110100|1001110|0111001|1010000 ~~0101000|1111011|1000001|0110110|1011111Y  
0101001|1111010|1000000|0110111|1011110Y  
0101010|1111001|1000011|0110100|1011101Y  
0101011|1111000|1000010|0110101|1011100Y  
0101100|1111111|1000101|0110010|1011011Y  
0101101|1111110|1000100|0110011|1011010Y  
0101110|1111101|1000111|0110000|1011001Y  
0101111|1111100|1000110|0110001|1011000Y~~  
0110000|1100011|1011001|0101110|1000111  
0110001|1100010|1011000|0101111|1000110  
0110010|1100001|1011011|0101100|1000101  
0110011|1100000|1011010|0101101|1000100  
0110100|1100111|1011101|0101010|1000011  
0110101|1100110|1011100|0101011|1000010  
0110110|1100101|1011111|0101000|1000001  
0110111|1100100|1011110|0101001|1000000  
0111000|1101011|1010001|0100110|1001111  
0111001|1101010|1010000|0100111|1001110  
0111010|1101001|1010011|0100100|1001101  
0111011|1101000|1010010|0100101|1001100  
XOR |Accel |Gyro\_ |Magnet |Pressure  
0111100|1101111|1010101|0100010|1001011  
0111101|1101110|1010100|0100011|1001010  
0111110|1101101|1010111|0100000|1001001  
0111111|1101100|1010110|0100001|1001000  
1000000|0010011|0101001|1011110|0110111  
1000001|0010010|0101000|1011111|0110110  
1000010|0010001|0101011|1011100|0110101  
1000011|0010000|0101010|1011101|0110100  
1000100|0010111|0101101|1011010|0110011  
1000101|0010110|0101100|1011011|0110010  
1000110|0010101|0101111|1011000|0110001  
1000111|0010100|0101110|1011001|0110000  
1001000|0011011|0100001|1010110|0111111  
1001001|0011010|0100000|1010111|0111110  
1001010|0011001|0100011|1010100|0111101  
1001011|0011000|0100010|1010101|0111100  
1001100|0011111|0100101|1010010|0111011  
1001101|0011110|0100100|1010011|0111010  
1001110|0011101|0100111|1010000|0111001  
1001111|0011100|0100110|1010001|0111000 ~~1010000|0000011|0111001|1001110|0100111X  
1010001|0000010|0111000|1001111|0100110X  
1010010|0000001|0111011|1001100|0100101X  
1010011|0000000|0111010|1001101|0100100X~~  
1010100|0000111|0111101|1001010|0100011  
1010101|0000110|0111100|1001011|0100010  
1010110|0000101|0111111|1001000|0100001  
1010111|0000100|0111110|1001001|0100000  
1011000|0001011|0110001|1000110|0101111  
1011001|0001010|0110000|1000111|0101110  
1011010|0001001|0110011|1000100|0101101  
1011011|0001000|0110010|1000101|0101100  
1011100|0001111|0110101|1000010|0101011  
1011101|0001110|0110100|1000011|0101010  
1011110|0001101|0110111|1000000|0101001  
1011111|0001100|0110110|1000001|0101000 ~~1100000|0110011|0001001|1111110|0010111Y  
1100001|0110010|0001000|1111111|0010110Y  
1100010|0110001|0001011|1111100|0010101Y  
1100011|0110000|0001010|1111101|0010100Y  
1100100|0110111|0001101|1111010|0010011Y  
1100101|0110110|0001100|1111011|0010010Y  
1100110|0110101|0001111|1111000|0010001Y  
1100111|0110100|0001110|1111001|0010000Y  
1101000|0111011|0000001|1110110|0011111X  
1101001|0111010|0000000|1110111|0011110X  
1101010|0111001|0000011|1110100|0011101X  
1101011|0111000|0000010|1110101|0011100X~~  
1101100|0111111|0000101|1110010|0011011  
1101101|0111110|0000100|1110011|0011010  
1101110|0111101|0000111|1110000|0011001  
1101111|0111100|0000110|1110001|0011000  
1110000|0100011|0011001|1101110|0000111  
1110001|0100010|0011000|1101111|0000110  
1110010|0100001|0011011|1101100|0000101  
1110011|0100000|0011010|1101101|0000100 ~~1110100|0100111|0011101|1101010|0000011X  
1110101|0100110|0011100|1101011|0000010X  
1110110|0100101|0011111|1101000|0000001X  
1110111|0100100|0011110|1101001|0000000X~~  
XOR |Accel |Gyro\_ |Magnet |Pressure  
1111000|0101011|0010001|1100110|0001111  
1111001|0101010|0010000|1100111|0001110  
1111010|0101001|0010011|1100100|0001101  
1111011|0101000|0010010|1100101|0001100  
1111100|0101111|0010101|1100010|0001011  
1111101|0101110|0010100|1100011|0001010  
1111110|0101101|0010111|1100000|0001001  
1111111|0101100|0010110|1100001|0001000