```
/*********************************************
 * File:    humidicon.c
 * Author:  Bryant Gonzaga
 * Date:    3/6/2018
 *********************************************/

#include "humidicon.h"

extern unsigned char humidicon_byte0;
extern unsigned char humidicon_byte1;
extern unsigned char humidicon_byte2;
extern unsigned char humidicon_byte3;
extern unsigned long int humidity;
extern unsigned long int temperature;

void spi_humidicon_config()
{
    // unselect PA0
    DDRA |= _BV(0);
    // enable SPI, Master, CPOL = 1 CPHA = 1, fck/64
    SPCR = _BV(SPE) | _BV(MSTR) | _BV(CPOL) | _BV(CPHA) | _BV(SPR1) |
_BV(SPR0);
    // clear any old data
    char temp = SPSR;
    temp = SPDR;
}

unsigned char read_humidicon_byte()
{
    // write to data register to start sclk
    SPDR = 0x00;
    // wait for transmission complete
    while ( !(SPSR & _BV(SPIF)) ) {
    }
    // clear SPIF bit in SPSR
    char temp = SPDR;

    return temp;
}

void read_humidicon()
{
    // select slave
    PORTA &= ~_BV(0);

    humidicon_byte3 = read_humidicon_byte();
    humidicon_byte2 = read_humidicon_byte();
    humidicon_byte1 = read_humidicon_byte();
    humidicon_byte0 = read_humidicon_byte();

    // unselect slave
    PORTA |= _BV(0);

    // sshh hhhhh - hhhh hhhh - tttt tttt - tttt ttxx
    unsigned int temp = humidicon_byte0 + ( ((int) humidicon_byte1) <<
8);
```

```
    unsigned int humi = humidicon_byte2 + ( ((int) humidicon_byte3) <<
8);
    temp >>= 2; // fix shifted number
    humi &= 0x3FFF;

    humidity = compute_scaled_rh(humi);
    temperature = compute_scaled_temp(temp);
}

//*****************************************************************
**********
// Function : unsigned int compute_scaled_rh(unsigned int rh)
// Date and version : version 1.0
// Target MCU : ATmega128A
// Author : Ken Short
// DESCRIPTION
// Computess scaled relative humidity in units of 0.01% RH from the
raw 14-bit
// realtive humidity value from the Humidicon.
//
//
// Modified
//*****************************************************************
**********
long int compute_scaled_rh(unsigned int rh)
{
    long int temp = ( (long) rh ) * 10000;
    long int tmpo = temp / 16382;
    return tmpo;
}

//*****************************************************************
**********
// Function : unsigned int compute_scaled_temp(unsigned int temp)
// Date and version : version 1.0
// Target MCU : ATmega128A
// Author : Ken Short
// DESCRIPTION
// Computess scaled temperature in units of 0.01 degrees C from the
raw 14-bit
// temperature value from the Humidicon
//
//
// Modified
//*****************************************************************
**********
long int compute_scaled_temp(unsigned int temp)
{
    long int tmp = ( (long) temp ) * 16500;
    long int tmo = (tmp / 16382) - 4000;
    return tmo;
}
```