

Firmware Mess-Station Betreuer

```

'
'3.6..2010   JCF

$crystal = 8000000
$regfile = "m8def.dat"
$hwstack = 100

$baud = 9600

Config Portd.4 = Output           'LED
Config Portc.0 = Output           'MOSFET Heizwiderstand
Portc.0 = 0
Config Portd.2 = Output           'R/W\=Tristate
Portd.2 = 1

'I2C CO2-Sensor
Config Sda = Portc.4
Config Scl = Portc.5

'CO2-Sensor Variablen
Dim Co2status As Byte
Dim Co2value As Word
Dim Co2value_h As Byte At Co2value Overlay
Dim Co2value_l As Byte At Co2value + 1 Overlay
Dim Co2checksum As Byte
Dim Oldco2value As Word

'DS18B20 drei Temperatur-Sensoren
Dim Dsread(9) As Byte
Dim Itemperature As Integer At Dsread Overlay           'enthält Temp. in 0.0625°C
Dim Temperature As Single
Dim Temperature_inside_far As Single
Dim Temperature_inside_near As Single
Dim Temperature_outside As Single
Dim Tpin As Byte           'Variable zur auswahl des Sensors (Pin)
Config Iwire = Portd       'alle Sensore hängen an PortD

Dim I As Byte

'Temperatur-Regelung
Dim Wtemp As Single           'Sollwert Temperatur
Dim Onflag As Bit             'Heizung ein
Dim Heatingpercent As Byte     'Heizleistung in %
Dim Tmpheatingpercent As Byte  'Heizleistung in %
Dim Secshp As Byte           'Sekunden für Heizleistung in %

'Timer1 für 1s - Interrupt
Ocrlah = High(31250)
Ocr1al = Low(31250)
Config Timer1 = Timer , Prescale = 256 , Clear Timer = 1 , Compare A = Disconnect
On Ocla Timer1_isr
Enable Ocla
Enable Interrupts
Dim Secs As Long
Dim New_flag As Bit

'Jumper -> jede s Wert ausgeben (1) oder nur auf Anfrage (0)
Config Pinc.2 = Input
Portc.2 = 1           'Pullup

'Serieller Interrupt für Kommandos
On Urxc Serialinterrupt
Enable Urxc
Dim Ok As Byte           'empfangenes Kommando

'-----
'MAIN:
Wtemp = 25           'Sollwert Temperatur

Do

    'Jede Sekunde messen
    If New_flag = 1 Then

        'Temperaturen messen
        Gosub Measurealltemp

```

```

'CO2 messen
Gosub Measureco2

'Jumper gesetzt? Wenn ja, nur auf Anfrage Wert geben sonst immer
If Pinc.2 = 1 Then Gosub Displayvalues

'Zweipunktregelung
If Temperature_inside_near < Wtemp Then
    Onflag = 1
    Portc.0 = 1
Else
    Onflag = 0
    Portc.0 = 0
End If

'Bestimmung Heizleistung in % über 100s
Tmpheatingpercent = Tmpheatingpercent + Onflag
Secshp = Secshp + 1
If Secshp >= 100 Then
    Heatingpercent = Tmpheatingpercent
    Tmpheatingpercent = 0
    Secshp = 0
End If

'Sekundenflag rücksetzen
New_flag = 0

End If

'wenn "*" empfangen Daten schicken
If Ok = "*" Then
    Ok = ""
    Gosub Sendvaluesoncommand
End If

Loop
'-----
' ***** INTERRUPTS *****
'-----
Timer1_isr:
'Jede Sekunde
    Incr Secs
    New_flag = 1
    Toggle Portd.4
Return
'-----
Serialinterrupt:
'Wenn "*" als Kommando: neue Messung erlauben
    'If Udr = "*" Then Gosub Displayvaluesoncommand
    Ok = Udr
Return
'-----
' ***** CO2 - MESSUNG *****
'-----
Measureco2:
'Senseair K30-Sensor über I2C ansprechen
'auf Fehler prüfen (Sensor nicht bereit) durch Auslesen des Statusbytes
'falls nicht bereit: CO2status =0, falls Ok: 1

'für K33 mit 10 multiplizieren

    I2cstart
    I2cwbyte 0
    I2cstop

    Waitms 1

    I2cstart
    I2cwbyte &H00 'Adresse (&h68 1 Bit nach links, Bit0=R/W=0
(schreiben)
    I2cwbyte &H22 'Read RAM 2 Bytes
    I2cwbyte &H00 'Adresse H
    I2cwbyte &H08 'Adresse L
    I2cwbyte &H2A 'Checksum
    I2cstop

    Waitms 20

    I2cstart

```

```

I2cwbyte &HD1                                'Lesen an Adresse &h68
I2crbyte Co2status , Ack
I2crbyte Co2value_l , Ack
I2crbyte Co2value_h , Ack
I2crbyte Co2checksum , Nack
I2cstop

Co2status = Co2status And 1

'wenn neuer Wert nicht gültig: alten nehmen
If Co2status = 0 Then Co2value = Oldco2value

'für K33 *10
''Co2value = Co2value * 10

'alten Wert speichern
If Co2status = 1 Then Oldco2value = Co2value

Return
'-----
' ***** TEMPERATURMESSUNG
'-----
Measurealltemp:
'Alle Temperaturen messen

    Tpin = 7                                'innen nah
    Gosub Measuretemperature
    Temperature_inside_near = Temperature

    Tpin = 6                                'innen fern
    Gosub Measuretemperature
    Temperature_inside_far = Temperature

    Tpin = 5                                'aussen
    Gosub Measuretemperature
    Temperature_outside = Temperature

Return
'-----
Measuretemperature:
'Temperatur steht in Variable Temperature
'TPin muss Sensor auswählen u. vorher gesetzt sein

    'Messen
    lwreset Pind , Tpin
    lwwrite &HCC , 1 , Pind , Tpin          'alle herhören
    lwwrite &H44 , 1 , Pind , Tpin          'Messen
    Waitus 200

    'auslesen
    lwreset Pind , Tpin
    lwwrite &HCC , 1 , Pind , Tpin
    lwwrite &HBE , 1 , Pind , Tpin          'RAM auslesen
    Dsread(1) = lwread(9 , Pind , Tpin )     '9 Byte lesen

    'ITemperature ist schon der Wert aus MSB:LSB
    'da an Speicherplatz DsRead (1,2) deklariert
    Temperature = Itemperature * 0.0625

Return
'-----
' ***** ANZEIGE *****
'-----
Displayvalues:
'für dauernde Anzeige
Print Secs;
Print Chr(9);
Print Temperature_outside;
Print Chr(9);
Print Temperature_inside_far;
Print Chr(9);
Print Temperature_inside_near;
Print Chr(9);
Print Onflag;
Print Chr(9);
    If Co2status = 1 Then Print Co2value ; Else Print " ";
Print Chr(9);
''If Co2status = 1 Then Print "OK" ; Else Print "Error";
Print Heatingpercent;
Print Chr(9);
Print Tmpheatingpercent;

```

```

    Print

Return
'-----
Sendvaluesoncommand:
'display only when master asks for values

    Waitms 1
'switch cable driver from Tristate to Output mode
    Portd.2 = 0

'send values
    Waitms 50

    Print Secs
    Print Temperature_outside
    Print Temperature_inside_far
    Print Temperature_inside_near
    Print Onflag
    Print Co2status
    Print Co2value
    Print Heatingpercent
    Print

'wait some time for last characters to be on the wire
    Waitms 10

'switch cable driver back to Tristate mode
    Portd.2 = 1

Return
'-----

Displayaddress:
    lwreset Pind , Tpin

    'skip ROM, also alle Bausteine ansprechen
    ' (es ist nur einer da also keine gezielte Adressierung nötig)

    lwwrite &HCC , 1 , Pind , Tpin
    Dsread(1) = lwsearchfirst(pind , Tpin )

    '8Byte Adresse hex. anzeigen
    For I = 1 To 8
        Print Hex(dsread(i));
    Next I
    Print Chr(9);
Return

```