

```

1
2 ; Decimal precision Humidity & Temperature routines,
3 ; copyright, Peter H Anderson, Baltimore, MD, Jan, '04
4
5 ; Modified for my own purposes - Jan 2011. vwlowen.co.uk
6
7 #Picaxe 18M2
8
9 Symbol HValue = w0
10 Symbol HighWord = w1
11 Symbol LowWord = w2
12 Symbol RH10 = w3
13 Symbol HQuotient = b0
14 Symbol HFract = b1
15 Symbol X = b0
16 Symbol aDig = b1
17 Symbol TFactor = b2
18 Symbol Tc = b3
19 Symbol SignBit = b4
20
21 Symbol TValue = w4
22 Symbol TQuotient = b10
23 Symbol TFract = b11
24 Symbol TempC_100 = w6
25
26 Symbol MagDir = w7
27 Symbol MagDirLo = b14
28 Symbol MagDirHi = b15
29
30 Symbol WindSpeed = w8
31 Symbol WindSpeedLo = b16
32 Symbol WindSpeedHi = b17
33 Symbol ThisHour = b18
34 Symbol LastHour = b19
35 Symbol RainRequest = b20
36
37
38 ; Hardware
39 Symbol HumidRaw = B.7
40 Symbol TempRaw = B.6
41 Symbol DirRaw = B.3
42 Symbol Speed = B.0
43
44 do
45
46 ; Read Humidity
47
48 ReadADC10 HumidRaw, HValue ;Get Humidity (HValue)
49 HighWord = 1613 ** HValue ; calculate RH
50 LowWord = 1613 * HValue
51 RH10 = LowWord / 1024
52 LowWord = HighWord * 64
53 RH10 = RH10 + LowWord
54 RH10 = RH10 - 258
55
56 pause 100
57
58 ; Read temperature
59
60 Readtemp12 TempRaw, TValue ;Get temperature
61
62 SignBit = TValue and $8000
63
64 if SignBit <> 0 then
65 SignBit = "-" ;It's negative so
66 TValue = TValue XOR $ffff + 1 ;take twos comp
67 else
68 SignBit = " "
69 endif
70
71 TempC_100 = TValue * 6 ;TC = value * 0.0625
72 TValue = TValue * 25 / 100
73 TempC_100 = TempC_100 + TValue
74 TQuotient = TempC_100 / 100
75 TFract = TempC_100 % 100 / 10

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76
77     X = TQuotient / 10                                ; Calculate temperature correction
factor for Humidity
78
79     if SignBit = "-" then
80         X = 4 - X
81     else
82         X = X + 4
83     endif
84
85
86     GoSub TempCorrection                                ; compensate RH
87
88     HQuotient = RH10 / 10                                ; Calculate RH Quotient and...
89     HFract = RH10 % 10                                ; ...decimal place.
90
91     if HQuotient > 99 then                                ;Over range
92         HQuotient = 99
93         HFract = 9
94     endif
95
96     if HQuotient > 127 then                                ;Under range
97         HQuotient = 0
98         HFract = 0
99     endif
100
101     ; Read AS540 magnetic encoder for wind direction
102
103     readadc10 DirRaw, MagDir                            ;Read from AS5040 magnetic bearing
104     pause 100
105
106     ; Read rpm from windspeed counter
107
108     count Speed, 1000, WindSpeed
109
110     ; Every 30th cycle (approx 1 minute), request rain gauge data from 08M
111
112     inc RainRequest
113     if RainRequest >= 30 then
114         high C.1
115         serin [500], C.0, N2400, ("r"), LastHour, ThisHour ; Rain counters
116         low C.1
117         RainRequest = 0
118     endif
119
120     ;Send data in 8 byte blocks
121
122     serout C.2, N2400, ("t", SignBit, TQuotient, TFract, HQuotient, HFract,
"A", "B")
123     pause 100
124     serout C.2, N2400, ("m", MagDirHi, MagDirLo, WindSpeedHi, WindSpeedLo,
LastHour, ThisHour, "C")
125     Loop
126
127
128
129 TempCorrection:
130     Lookup X, (87, 89, 91, 93, 95, 97, 99, 101, 103, 106, 108, 110, 113, 116,
119, 122, 126), TFactor
131     ' -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90
100 110 120
132
133     if TFactor < 100 then
134         aDig = TFactor / 10
135         RH10 = RH10 * aDig / 10
136         TFactor = TFactor % 10
137
138         aDig = TFactor
139         RH10 = RH10 * aDig / 100 + RH10
140
141     else
142         TFactor = TFactor % 100
143
144         aDig = TFactor / 10
145         RH10 = RH10 * aDig / 10 + RH10

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```
146     TFactor = TFactor % 10
147
148     aDig = TFactor
149     RH10 = RH10 * aDig / 100 + RH10
150 endif
151
152 return
153
154
```