

```

1
2 ;=====
3 ; Main Indoor (Receiver) Program.
4 ;
5 ; Receives data from outdoor unit, displays on LCD and passes data on to PC
6 ;=====
7 ;
8 ;
9 #PICAXE 18M2
10 ;
11 ;
12 ; Variable Definitions (b0 to b5 are re-used for mBar code when they become
    available)
13
14     symbol TValue = w0
15     symbol Quotient = b2
16     symbol Fract = b3
17     symbol SignBit = b4
18     symbol Humidity = b5
19     symbol HFract = b14
20     symbol TempC_100 = w4
21
22     symbol Dir = w5
23     symbol DirLo = b10
24     symbol DirHi = b11
25
26     symbol Windspeed = w3
27     symbol SpeedLo = b6
28     symbol SpeedHi = b7
29
30     symbol RainCountThisHour = b12
31     symbol RainCountLastHour = b13
32     symbol LCDRainWhole = b21
33     symbol LCDRainFract = b22
34     symbol LastOrThis = b23
35
36     ; MCP3422 ADC variables
37
38     symbol mb900 = 17429                ; ADC reading for 900Mbar, then add
72.288 counts per mbar
39     symbol adj0 = 72
40     symbol adj1 = b4                    ; used to add 1 count every 4 mbar
41     symbol adj2 = b5                    ; used to add 1 count every 24 mbar
42     symbol mBar = w3
43
44     ; Housekeeping variables
45
46     symbol lastmbar = w8                ; Remember previous mBar reading
47     symbol RiseFall = b18              ; Indicator for pressure rising or
falling (up arrow or down arrow)
48     symbol active = b19                 ; Telltale shows activity on LCD screen
49     symbol LCD_Status = b20            ; Is LCD Backlight on or off (0 or 1)?
50
51
52     ; Hardware Definitions
53
54     symbol Wireless = C.7              ; Incoming connection from Wireless
receiver/decoder
55     symbol Computer = C.2              ; Outgoing serial connection to computer
56
57     symbol LCD = pinC.5                 ; Front-panel button to blank / unblank
LCD backlight
58     symbol ClearRiseFall = pinC.0       ; Front-panel button to clear pressure
'rising / falling' indicator
59     symbol LastOrThisSwitch = pinC.1    ; Front-panel button to display current
or previous hour's rainfall
60
61
62 Init:
63     hsersetup B9600_4, %10000          ; Use LCD Pin 1, no
hserin
64                                         ; ByVac 20x4 IASI-2
65

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66     hi2csetup i2cmaster, %11010000, i2cfast, i2cbyte           ; Initialize I2C
    for MCP3422 ADC chip.
67     hi2cout (%00011000)                                       ; set MCP3422 for
    16 bit continuous conversion
68
69     pause 500
70     hserout 0, (13) : pause 100                                ; Initialize LCD
71     hserout 0, (13) : pause 100
72     hserout 0, (13) : pause 100
73     pause 500
74
75     hserout 0, ("ac50", 13)
76     hserout 0, ("ad", 32, 32, 32, 32, 49, 42, 36, 32, 13) ; Define down arrow
    character (char 10)
77
78     hserout 0, ("ac1", 13)                                     ; Clear display
79     pause 50
80     hserout 0, ("acc", 13)                                     ; Hide cursor
81
82     hserout 0, ("ac81", 13, "ad ", $df, "C", 13)              ; Print the headings
83     hserout 0, ("ac88", 13, "admBar", 13)
84     hserout 0, ("ac8e", 13, "adRH %", 13)
85
86     hserout 0, ("acd5", 13, "ad", "dir", 13)                  ; Print footings
    ;
87     hserout 0, ("acdc", 13, "ad", "mph", 13)                  ;
88     hserout 0, ("ace3", 13, "ad", "mm", 13)
89     ;
90
91     lastmbar = 0                                              ; Initialize
    variables
92     LastOrThis = "c"
93
94     ;=====
95     ; Main Loop
96     ;=====
97
98 main:
99
100
101     ; Check if a front-panel switch is pressed. The Picaxe interrupt mechanism
    is
102     ; almost permanently disabled due to the large number of serin and serout
    commands
103     ; so sprinkling the program with 'gosub switches' to check the switch
    status is more
104     ; effective that interrupts.
105
106     gosub switches
107
108     ; Get first group of values from outdoor unit via 433MHz radio link.
109
110     serin Wireless, N2400, ("t"), SignBit, Quotient, Fract, Humidity, HFract,
    b15, b15
111
112
113     ; Flash 'telltale' on LCD to indicate activity and successful 'serin' from
    wireless.
114
115     gosub telltale
116
117
118     ; Display first group on LCD
119
120     hserout 0, ("acc0", 13)
121     hserout 0, ("ad", SignBit, #Quotient, ".", #Fract, " ", 13)
122     hserout 0, ("acce", 13)
123     hserout 0, ("ad", #Humidity, ".", #HFract, " ", 13)
124
125
126     gosub switches
127
128
129     ; Send first group to computer COM port
130

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131 ; Each group has a start identifier, data and an end identifier:
132 ; Start = "xS", End is "xE" eg Wind Start is WS, Wind End is WE
133 ; Multiple data are separated by a single space character.
134
135 serout Computer, N2400, ("TS", #Quotient, " ", #Fract, "TE") ;
Temperature
136 serout Computer, N2400, ("HS", #Humidity, " ", #HFract, "HE") ; Humidity
137
138 ; Check switches again and at regular intervals throughout program.
139 gosub switches
140
141
142 ; Get second group of values from outdoor unit radio link.
143
144 ; serin Wireless, N2400, ("m"), DirLo, DirHi, SpeedLo, SpeedHi,
RainCountLastHour, RainCountThisHour, b15
145 serin Wireless, N2400, ("m"), DirHi, DirLo, SpeedHi, SpeedLo,
RainCountLastHour, RainCountThisHour, b15
146
147 gosub telltale
148
149 WindSpeed = SpeedHi * 256 + SpeedLo
150 WindSpeed = WindSpeed * 300 / 448
151
152 Dir = DirHi * 256 + DirLo ; Direction is
sent as HiByte and LoByte
153 Dir = Dir * 64 / 182
154
155 if LastOrThis = "c" then ; Decide whether
to display previous hour's
156 LCDRainWhole = RainCountThisHour / 2 ; rainfall or
the current hour's.
157 LCDRainFract = RainCountThisHour * 5 // 10
158 else
159 LCDRainWhole = RainCountLastHour / 2 ;
160 LCDRainFract = RainCountLastHour * 5 // 10
161 endif
162
163 ; Send second group to LCD
164
165 hserout 0, ("ac95", 13)
166 hserout 0, ("ad", #Dir, " ", 13)
167
168 hserout 0, ("ac9c", 13)
169 hserout 0, ("ad", #WindSpeed, " ", 13)
170
171 hserout 0, ("aca1", 13)
172 hserout 0, ("ad", LastOrThis, " ", #LCDRainWhole, ".", #LCDRainFract, "
", 13)
173
174
175 ; Send second group to computer COM port
176
177 serout Computer, N2400, ("WS", #Dir, " ", #Windspeed, "WE") ; Wind
178 serout Computer, N2400, ("RS", #RainCountLastHour, " ", RainCountThisHour,
"RE") ; Rain
179
180 gosub switches
181
182 ; Thanks to 'matherp' on the Picaxe forum for the following code:
183
184 ; Measuring atmospheric pressure with a MPX4115A
185 ; Analogue to digital conversion using a MCP3422
186 ; MPX output to V+, 2.5V to V-
187 ; ADC in 16 bit mode
188
189 hi2cin (b1,b0,b2) ; Read in the ADC reading and the status byte
from MCP3422
190
191 adj1 = 0
192 adj2 = 0
193 w1 = mb900
194
195 mbar = 900
196 do while w0 > w1

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197     inc mbar
198     w1 = w1 + adj0
199     inc adj1
200     if adj1 = 4 then
201         inc adj2
202         w1 = w1 + 1
203         adj1 = 0
204     endif
205     if adj2 = 6 then
206         w1 = w1 + 1
207         adj2 = 0
208     endif
209 loop
210
211 gosub switches
212 gosub telltale
213
214 ; Send pressure to computer COM port
215
216 serout Computer, N2400, ("PS:", #mbar, "PE")
217
218 ; Initialize previous pressure reading (lastmbar) if not already set
219 if lastmbar = 0 then
220     lastmbar = mbar
221     RiseFall = " "
222 endif
223
224 ; Display up arrow or down arrow if pressure has changed
225 if mbar > lastmbar then
226     RiseFall = "^" ; ^
227     lastmbar = mbar
228 endif
229
230 if mbar < lastmbar then
231     RiseFall = 10 ; Custom LCD character. Down arrow
232     lastmbar = mbar
233 endif
234
235 hserout 0, ("acc7", 13)
236 hserout 0, ("ad", RiseFall, #mbar, " ", 13)
237
238 gosub telltale
239 goto main
240
241 ; Check if one of the front panel buttons is pressed.
242 switches:
243 if LCD = 1 then ; LCD Button caused
244     interrupt
245     if LCD_Status = 0 then ; Backlight is on so...
246         hserout 0, ("ab0", 13) ; Turn it off
247         LCD_Status = 1
248     else
249         hserout 0, ("ab1", 13) ; Else turn it on.
250         LCD_Status = 0
251     endif
252     do: loop while LCD = 1 ; Don't return while
253     button is pressed
254     endif
255
256 if ClearRiseFall = 1 then ; Pressure rise/fall
257     button cause interrupt ; Clear indicator
258     RiseFall = " "
259 and...
260     hserout 0, ("acc7", 13) ; ... update display.
261     hserout 0, ("ad", RiseFall, #mbar, " ", 13)
262     do: loop while ClearRiseFall = 1
263     endif
264
265 if LastOrThisSwitch = 1 then ; Rain Previous Hour /
266     Last Hour button.
267     if LastOrThis = "c" then

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267     LastOrThis = "p"
268     LCDRainWhole = RainCountLastHour / 2           ; Recalculate values
and re-display to ;
269     LCDRainFract = RainCountLastHour * 5 // 10     ; give visual
confirmation of button-press
270     else
271         LastOrThis = "c"
272         LCDRainWhole = RainCountThisHour / 2       ;
273         LCDRainFract = RainCountThisHour * 5 // 10
274     endif
275     hserout 0, ("aca1", 13)
276     hserout 0, ("ad", LastOrThis, " ", #LCDRainWhole, ".", #LCDRainFract, "
", 13)
277     do : loop while LastOrThisSwitch = 1
278     endif
279     return
280
281
282 ; Flash "tell-tale" on LCD display to show activity
283 telltale:
284     if active = "*" then
285         active = " "
286     else
287         active = "*"
288     endif
289     hserout 0, ("ac80", 13, "ad", active, 13)
290     return

```