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1   ; ********************************************************************************************************************
2   ; **  PROGRAMME MAKED BY FADISHOP   Card: FADICLOCK        http://www.fadishop.eu  FADITECO, S.L.U.  Lleonard G. **
3   ; **  This program reads the current time and date, also reads the temperature every 64 seconds.                     **
4   ; **  Sets the current time by program and a DS3232 RTC alarm that is activated by interrupt PortC (C.7)           **
5   ; **  SLAVE ADDRESS IS STILL DS3232 I2C $ D0.                                                                       **
6   ; **  ALARM INTERRUPT ROUTING JP6 (BLUE JUMPER) (I0=1, I1=0, I2=0, portC.7=1;  Rpullup=1)                           **
7   ; **                                                                                                              **
8   ; ********************************************************************************************************************
9   ; SETTINGS
10  #picaxe 28x2
11  let dirsB=%10000000     ; 1=output 0=input
12  let dirsC=%00000000     ; 1=output 0=input
13  ; C.3 I2C_SCL
14  ; C.4 I2C_SDA
15  ;adcsetup = %00000000   ; SETTING ANALOG
16  ;setfreq em16           ; Oscillator / external oscillator to 16Mhz.
17  device_DS3232SN:
18  symbol adress_slave_A =$D0    ; Address 0xD0 DS3232 I2C only.
19  symbol @now=$00               ; Internal adress register of seconds, minutes and hours.
20  symbol @today=$03             ; Internal adress register of dayanal, day, month and year-century.
21  symbol @alm1=$07              ; Internal adress register alarm_1 (sec, min, hour and day / day).
22  symbol @alm2=$0B              ; Internal adress register alarma2 (min, hour and day / day).
23  symbol @control=$0E           ; (7)/EOSC (6)BBSQW (5)CONV (4-3)RS2-1 (2)INTCN (1)A2IE (0)A1IE
24  symbol @status=$0F            ; (7)OSF (6)BB32KHZ (5-4)CRATE (3)EN32KHZ (2)BSY (1)A2F (0)A1F
25  symbol @offset=$10            ; temperature offset. (adds / subtracts capacitance)
26  symbol @temp=$11              ; Internal word temperature address($11-MSB_temperature and $12-LSB_temperature) .
27  symbol @test=$13              ; Reserved for test.
28  symbol @sram=$14              ; Internal address of the start of the block of 236 bytes SRAM.
29  symbol control=b16            ; Register/shadow control DS3232.
30  symbol status=b18             ; Register/shadow control/status DS3232.
31  ; Program Definitions and Initialization
32  symbol seconds=b0
33  symbol minutes=b1
34  symbol hour=b2
35  symbol day=b3
36  symbol date=b4
37  symbol mounth=b5
38  symbol year=b6
39  symbol T_msb=b7
40  symbol T_lsb=b8
41
42  ;INICIALITZACIONES:
43  let control =%00011100                      ; Match default initialization.
44  let status =%11001000                       ; Match default initialization.
45  call set_time_date                          ; Change the date-time DS3232 RTC.
46  call set_alarm1                             ; Alarma_1 sets the DS3232 RTC.
47  configuracio_interrupcions:
48  setint %00000000,%10000000                  ; By falling edge interrupts are enabled by the pinC.7.
49
50  main:
51  i2cslave adress_slave_A, i2cslow, i2cbyte    ; DS3232 I2C Address (0xD0-0xD1)
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52   readi2c @now,(seconds,minutes,hour,day)          ; Read now (seconds minutes, hour and day)
53   readi2c @today,(date,mounth,year)                ; Read today (date, mounth and year)
54   readi2c @temp,(T_msb,T_lsb)                      ; Read 2 bytes temperature
55   readi2c @alm1,(b10,b11,b12,b13)                  ; Read alarma_1.
56   readi2c @control,(b17,b19)                       ; Read control registers.
57   debug                                            ; Output data to display PC
58   PAUSE 5000                                       ; Pause 5 seconds
59   goto main                                        ; Reboot
60
61
62
63   ; SECUENCIA DE INTERRUPCIÓN
64   interrupt:
65   play A.2,2                                       ; The buzzer is sounded FADILEDS card.
66   let status=status and %11111110                  ; Flag is cleared alarma_1 in DS3232.
67   let status=status and %11111101                  ; Flag is cleared alarma_2 in DS3232.
68   writei2c @control,(control,status)               ; We send and delete flag clearance A1F.
69   setint %00000000,%10000000                       ; by falling edge interrupts are enabled by the pinC.7.
70   return                                           ; After return is when you actually enable the interrupt.
71   ; SUBRUTINE
72   set_time_date:
73   symbol xseg=$25                                  ; @_intern DS3232: $00
74   symbol xminu=$00                                 ; @_intern DS3232: $01
75   symbol xhora=$13                                 ; @_intern DS3232: $02
76   symbol xsemdia=$00                               ; @_intern DS3232: $03
77   symbol xdia=$03                                  ; @_intern DS3232: $04
78   symbol xmes=$03                                  ; @_intern DS3232: $05
79   symbol xanno=$12                                 ; @_intern DS3232: $06
80   i2cslave adress_slave_A, i2cslow, i2cbyte        ; Adress I2C of DS3232 (0XD0-0XD1)
81   writei2c @now,(xseg,xminu,xhora,xsemdia,xdia,xmes,xanno); It send current date-time to the RTC DS3232.
82   return
83
84   set_alarm1:
85   symbol a1_seg=$00
86   symbol a1_min=$01
87   symbol a1_hor=$13                                ; Time format->bit(6)=0:24h, bit(6)=1:AM/PM 12h.
88   symbol a1_dia_sem=$03                            ; Day format-> bit(6)=0:dia del mes, bit(6)=1:dia de la semana.
89   i2cslave adress_slave_A, i2cslow, i2cbyte        ; Adress I2C of DS3232 (0XD0-0XD1)
90   writei2c @alm1,(a1_seg,a1_min,a1_hor,a1_dia_sem); It sends the settings of the alarma_1.
91   let control=control or %00000001                 ; Interruption is enabled alarma_1 A1E.
92   let control=control or %00000100                 ; Alarm interrupt is enabled INTCN in DS3232.
93   let status=status and %11111110                  ; Flag is cleared alarma_1 in DS3232.
94   writei2c @control,(control,status)               ; It sends and delete flag clearance A1F.
95   return
96
97   set_alarm2:
98   symbol a2_min=$01
99   symbol a2_hor=$13                                ; Time Format-> bit (6) h = 0:24, bit (6) = 1: AM / PM 12h.
100  symbol a2_dia_sem=$03                            ; Day format-> bits (6) = 0: day of the month, bit (6) = 1: day of the week.
101  i2cslave adress_slave_A, i2cslow, i2cbyte        ; Dirección I2C del DS3232 (0XD0-0XD1)
102  writei2c @alm2,(a2_min,a2_hor,a2_dia_sem)        ; It sends the settings of the alarma_2.
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103  let control=control or %00000010                ; Interruption is enabled alarma_1 A2E.
104  let control=control or %00000100                ; Alarm interrupt is enabled INTCN in DS3232.
105  let status=status and %11111101                 ; Flag is cleared alarma_2 in DS3232.
106  writei2c @control,(control,status)              ; It sends and delete flag clearance A2F.
107  return
```