NEC Infrared remote protocol decoding using a Microchip PIC10F322 microcontroler by Bertrand VANDEPORTAELE.

CPU freq is set to 8MHz for the PIC10F322

The 8bit Timer TMR0 is configured to measure the time between edges of the signal IR, demodulated output of the TFMS5380 MODULE (= TSOP1738).

Each time an edge on IR signal is detected, an interruption routine is processed. At the end of this routine, TMR0 content is set to 0 such that at the next interruption, TMR0 provides the duration since the previous IR edge.

Prescaler is set at 1:128, so TMR0 overflows (255->0) at 61,3hz. TMR0 is incremented at a 63.72349us rate.

Correspondance between time and number of TMR0 incrementations

9ms ↔ 141,23
4,5ms ↔ 70,61
2,25ms ↔ 35,30
560us ↔ 8,78
3*560us ↔ 26,36

We don't care about TMR0 postscaler, as TMR0 interrupt is not used.

OPTIONREG=6 (T0CS=0, TOSE=0, PSA=0, PS=110)

PIN2 is set to digital input:
ANSA2=0
TRISA{2}=1

Interrupt on change :

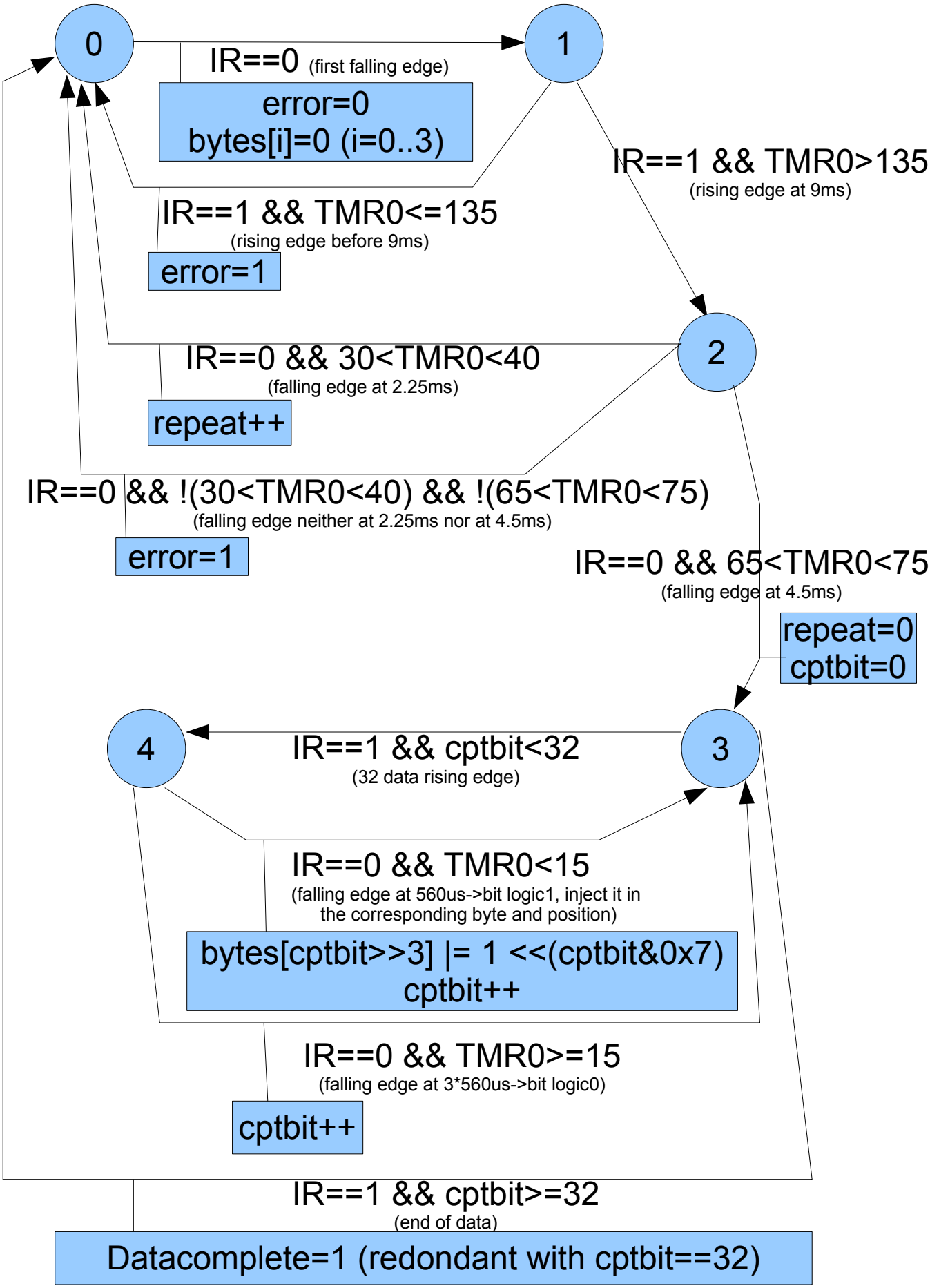
Flag bits (must be set to 0 by software at startup and in interruption routine, and automatically set to 1 by hardware):
-IOCIF general flag for Input/Output Change
-IOCAF2 individual flag for pin2 Input/Output Change

Configuration bits:
IOCIE=1 interrupt on change Interrupt Enable
IOCAP2=1 to authorize interrupt on change on rising edges
IOCAN2=1 to authorize interrupt on change on falling edges too
PEIE=1 to authorize peripheral interrupts
GIE=1 to globally authorize interrupts

MPLAB v8.91 simulator is buggy and cannot simulate correctly the PIC10F322 Timer 0 and 2.

A finite state machine is implemented as I/O interrupt on change routine.

State machine for reception of NEC infrared remote protocol



The state machine clock is the « interrupt on change » on pin IR. Each rising or falling edge can change the state. The state machine communicates with the program through:
Error: 1 indicates that there is an error in the process (not necessarily usefull except for debbuging purposes.)
Repeat: a numerical value that tells how many time the key of the remote has been kept pressed.
Datacomplete: 1 indicates that a new key has been pressed. The array of 4 **bytes** contains the 32 bits corresponding to the frame: 16 first ones identify the remote number, 8 next identify the key number, and 8 lasts should be the one complement of the key number.