IR Proximity Sensor Use with PIC12F675 in C language

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Objective:

The aim of this project is to learn how to make PIC12F675,in C language,to facilitate use of an IR proximity sensor as well as Altium Designer,MPLAB X compiler,and Saleae logic analyzer.

Project Details and Discussion:

PIC12F675 is an 8-bit microcontroller produced by Microchip as shown in Figure 1..For this project,PIC12F675 was chosen because of its simplicity,small dimension,as well as for its features like ADC and external interrupt availability.In order to investigate the use of external interrupt,only *GP2* pin has been used as an interrupt source.The interrupt expected by the PIC is *falling-edge* by choice.In other words whenever the proximity sensor output from *high to low*,for instance from $5V_{DC}$ to 0 V_{DC},the interrupt of PIC is triggered.The IR proximity sensor's output,shown in Figure 2,goes to 0 V_{DC} when an object or the sensor is approaching an *obstacle* (the sensor detects the *obstacle* when near ~1cm).

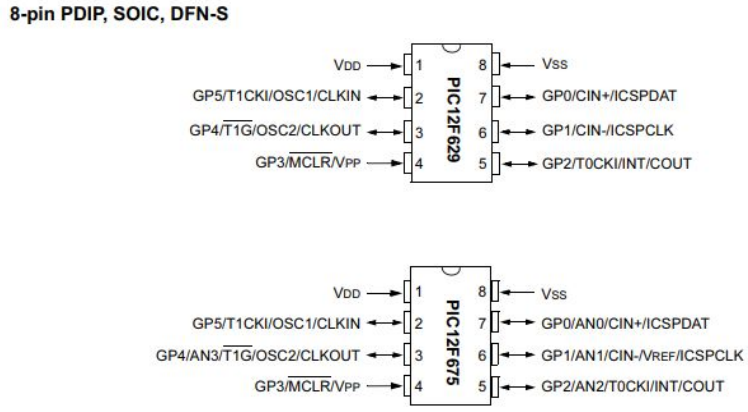

Figure 1: Pinout diagram of PIC12F675 [1]

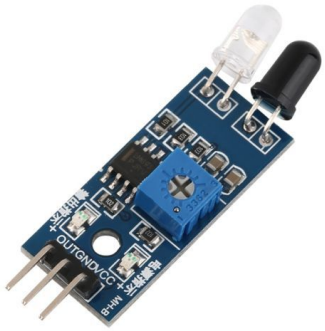

Figure 2: Picture of an IR Proximity Sensor used [2]

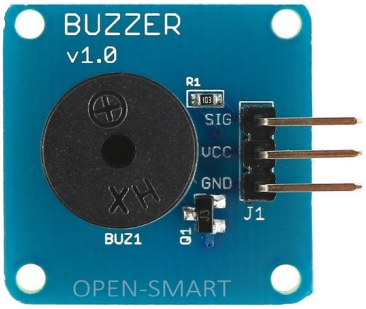

Figure 2: Picture of an IR Proximity Sensor used [3]

When an *obstacle* is detected by the IR proximity sensor,a *32 Hz* square-wave pulse is produced by the PIC microcontroller.The purpose of the pulse is of course to make the buzzer,shown in Figure 2, in the project make noise to catch attention of the user.When the *obstacle* near the proximity sensor is off by more than 3 cm,the sensor's output goes back to *high*,that is $5V_{DC}$,and the microcontroller goes out of the interrupt routine,and eventually the buzzer goes off as shown in Figure 5.

Project Schematic:

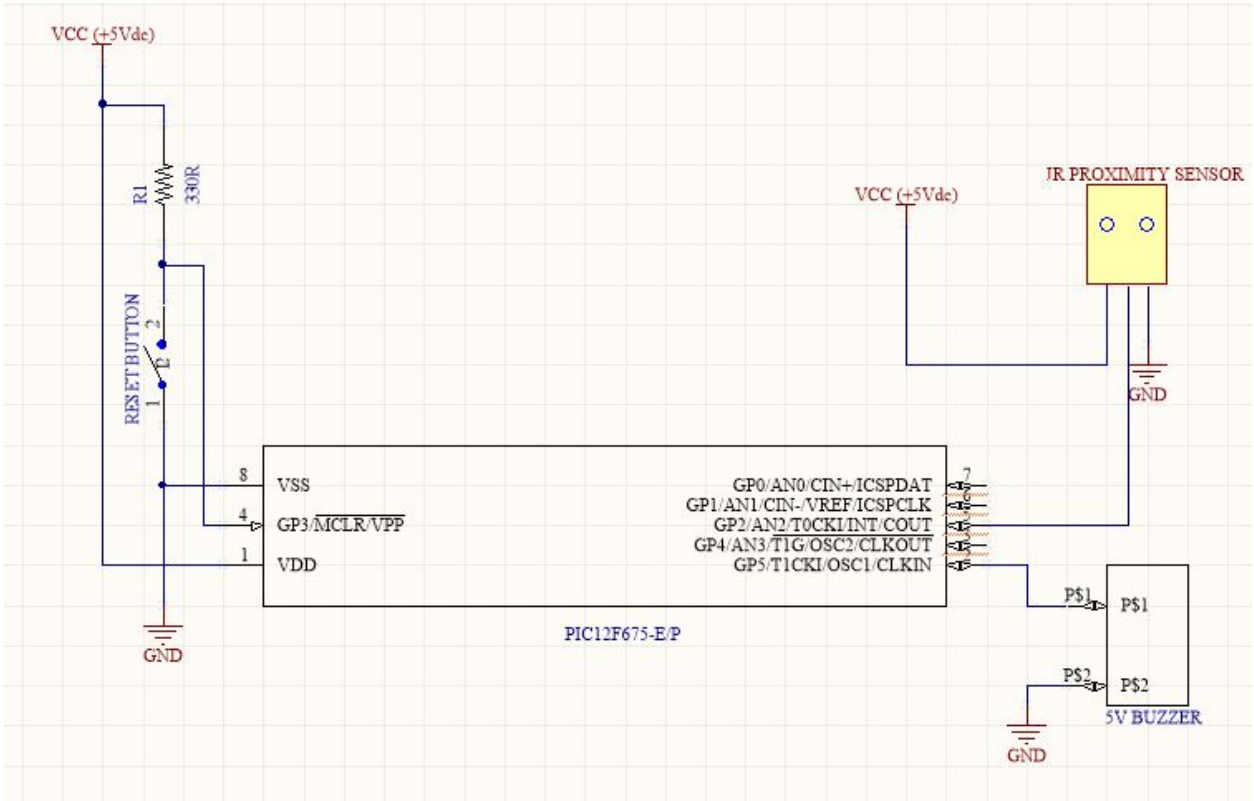

Figure 4 : Schematic design of the project with PIC12F675 (Altium Designer used)

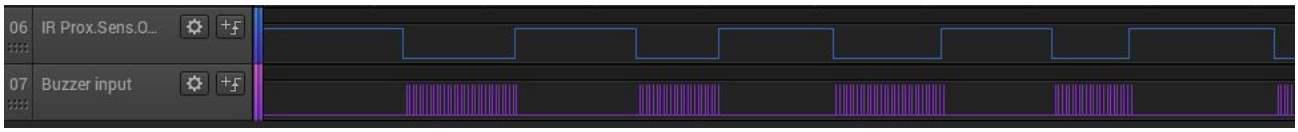

Figure 5: Saleae Logic Analyzer screenshot of Proximity sensor output and Buzzer input

References:

[1] Microchip,PIC12F675 datasheet :
https://ww1.microchip.com/downloads/en/devicedoc/41190c.pdf

[2] Infrared Proximity Sensor image:
http://www.dnatechindia.com/ir-proximity-sensor-module.html

[3] 5VDC Buzzer image:
https://www.aliexpress.com/item/Passive-Buzzer-module-5V-Piezo-Speaker-Play-Song-Melody-Module-for-Arduino/32680813535.html