

# PIC & PCB Layout

## Objective:

- Place a PIC on a breadboard
- Specify the minimum you need to get a PIC running
- Play tricks to make the power consumption as low as possible

## Introduction:

In ECE 401, you'll be designing a circuit board to do various things. Here we'll look at building a circuit with a PIC on a breadboard to control several inputs and output.

## Requirement:

Design an embedded system to act as a door alarm. If a door is left open for more than 30 seconds, an alarm goes off telling you to shut the door. Once the door is shut, the alarm goes off.

### Inputs:

- Switch:
  - Open: Door is open
  - Closed: Door is closed.
- FTDI USB to Serial Port (RC6 and RC7)
- Reset Button

### Outputs:

- 8 Ohm speaker
- LED light (heartbeat: blink on for 100ms every second to tell you the circuit is working)

### Relationship:

- If the door is open for 30+ seconds, a 220Hz square wave is sent to the speaker, on for 1 second, off for one second, repeat.

## Hardware Design:

### Processor Selection:

There are 300+ PIC processors available. For a processor to be useful, however, you need

- A C compiler, and
- A way to download the program.

The C compiler we're using works on a wide variety of processors. The boot-loader, however, is only tested on

- PIC18F4620                      40-pin PIC capable of running at 40MHz
- PIC18F2620                      28-pin PIC (same as 4820 without PORTD or PORTE)

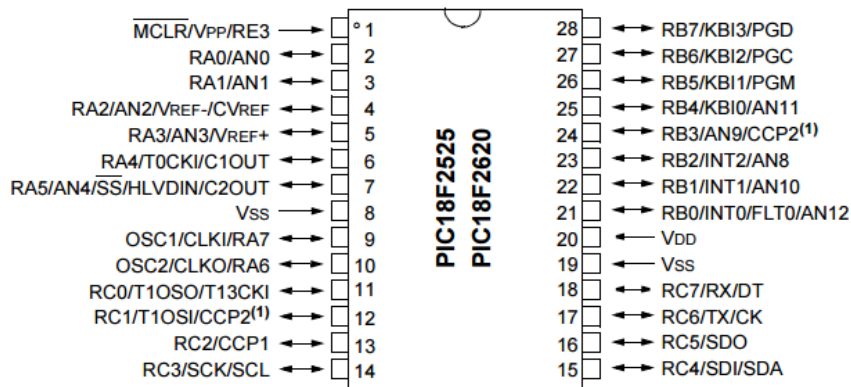
The boot-loader is really convenient:

- It allows you to provide power and ground to the PIC through the USB port
- It allows in-circuit programming of the PIC processor, and
- It allows debugging through the serial port. (You can send data to the serial port, similar to sending data to the LCD display)
- Everything you learned in ECE 376 applies to this chip

Since we only need a few I/O pins, let's use the 28-pin version of a PIC

Chip Selection: PIC18F2620

**28-Pin SPDIP, SOIC**

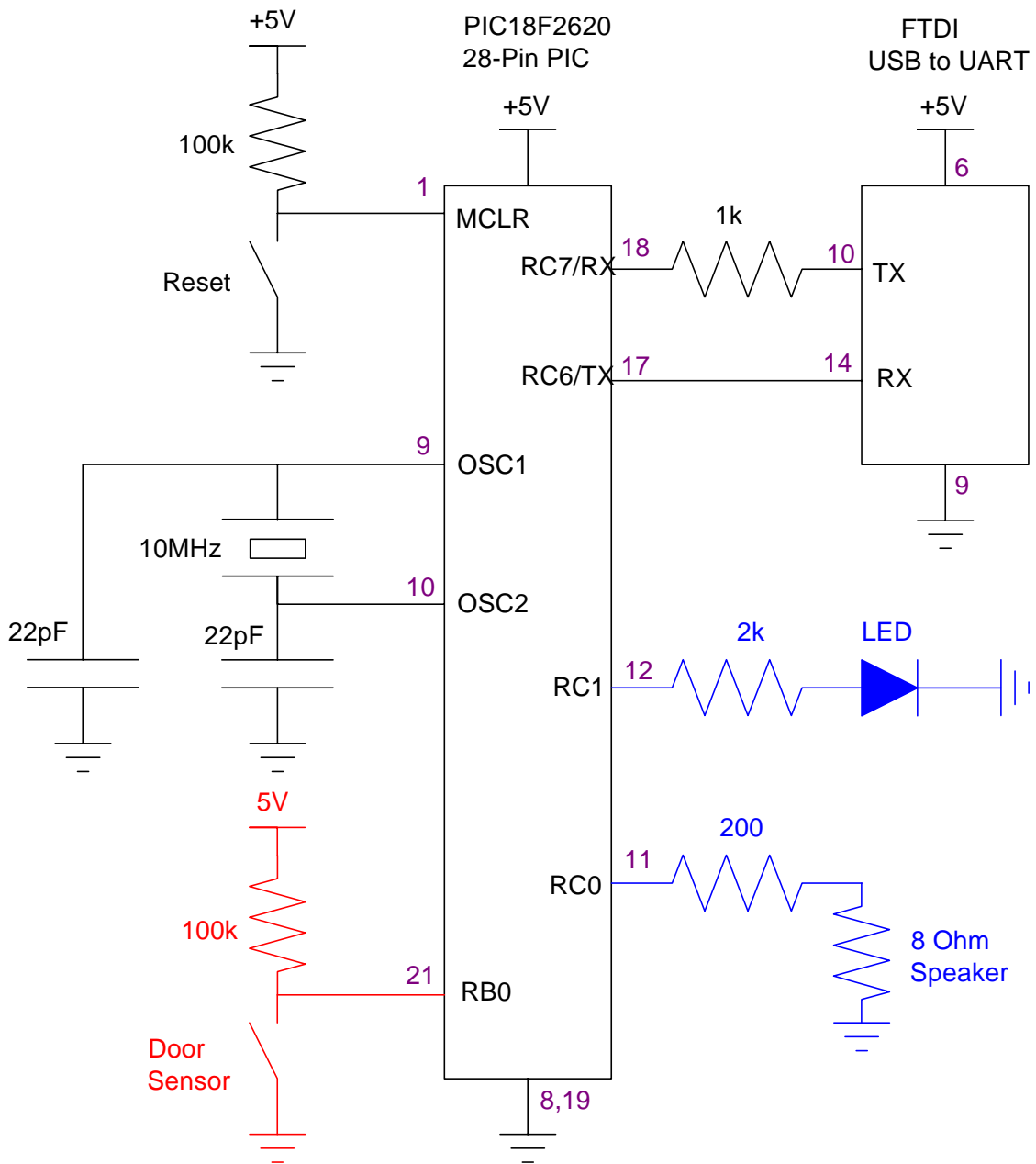


PIC I/O: Connect the inputs and outputs as follows:

PORTB							
7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	Door
							Input

PORTC							
7	6	5	4	3	2	1	0
TX	RX	-	-	-	-	LED	Spkr
Out	In					Out	Out

Schematic



## Major Components:

Processor: PIC18F2620 (www.Digikey.com)



[Product Index](#) > [Integrated Circuits \(ICs\)](#) > [Embedded - Microcontrollers](#) > Microchip Technology PIC18F2620-I/SP

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Product Overview	
Digi-Key Part Number	PIC18F2620-I/SP-ND
Quantity Available	1,169 Can ship immediately
Manufacturer	<a href="#">Microchip Technology</a>
Manufacturer Part Number	PIC18F2620-I/SP
Description	IC MCU 8BIT 64KB FLASH 28SDIP
Lead Free Status / RoHS Status	Lead free / RoHS Compliant
Moisture Sensitivity Level (MSL)	1 (Unlimited)
Manufacturer Standard Lead Time	4 Weeks
Detailed Description	PIC PIC® 18F Microcontroller IC 8-Bit 40MHz 64KB (32K x 16) FLASH 28-SPDIP

**Price & Procurement**

Quantity

PIC18F2620-I/SP-ND

Customer Reference

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All prices are in USD.

Price Break	Unit Price	Extended Price
1	5.29000	\$5.29
25	5.18600	\$129.15
100	5.04000	\$504.00

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