



Lab 6: Arduino Music Box (Bread Board)

Duration: End of class.

Implement an Arduino Music Box on a breadboard that plays a tune (e.g., *London Bridge is Falling Down ...*) when a push button is pressed. You will need the Arduino on a breadboard kit – containing an ATmega328p IC, resistors (2x 10K, 2x 220 ohm), capacitors (2x 22 pF), 1x 16 MHz crystal, 1x LED, 2x push buttons, and 1x CR1220 battery holder.

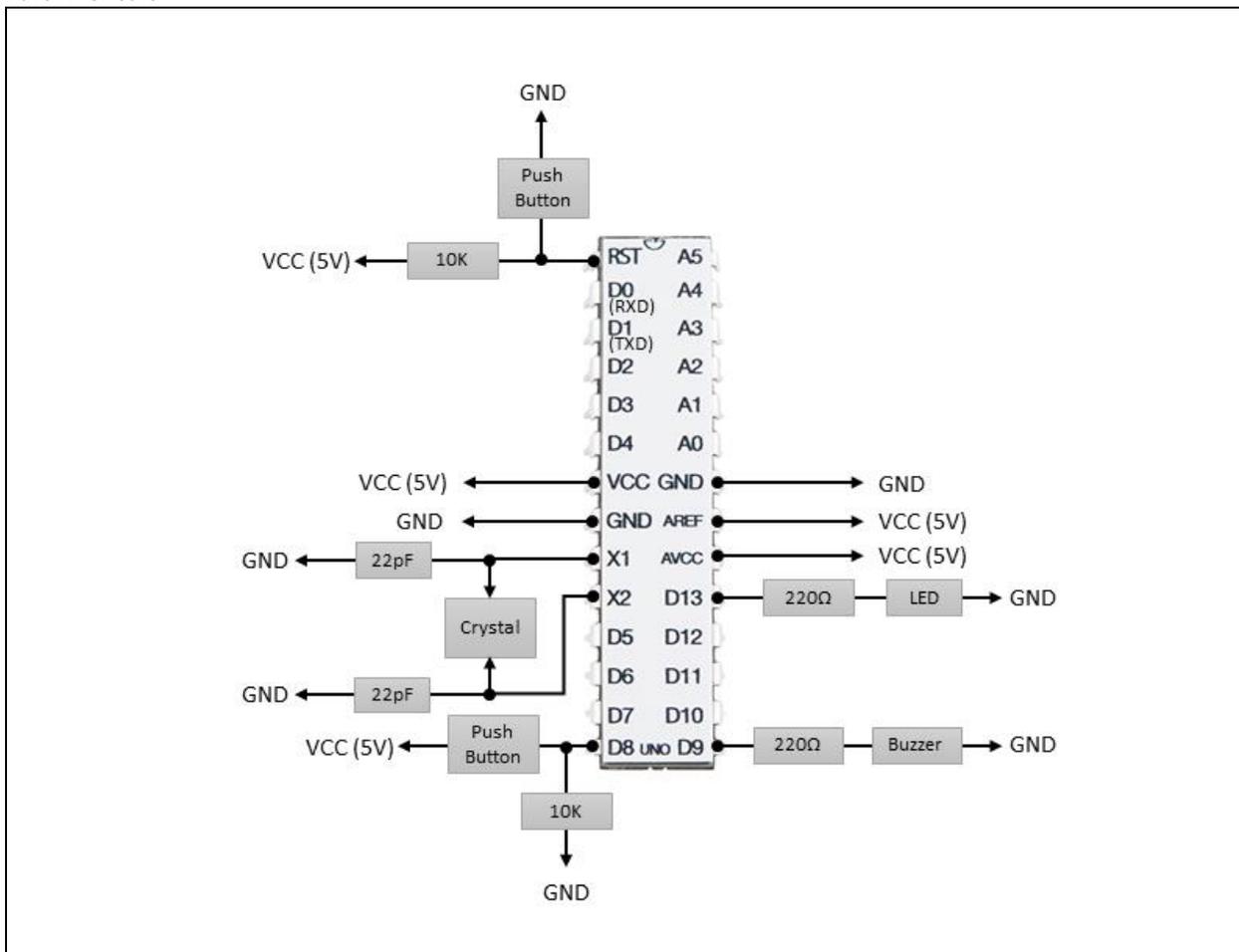
Things to note:

- Power the board with a battery; no need to implement the powering/voltage regulator circuitry.
- Implement a push button that will reset the Arduino.
- Implement an LED at Arduino digital pin D13. (This is a common practice on most Arduinos).
- Implement a buzzer at Arduino digital pin D9.
- Implement the music “play” button on Arduino digital pin D8.

Helpful resources:

- Pin mapping (<https://www.arduino.cc/en/Hacking/PinMapping168>)
- A similar (but not same) circuit (<https://www.jameco.com/jameco/workshop/jamecobuilds/arduinoocircuit.html>)
- A YouTube video (<https://www.youtube.com/watch?v=np3uzEVvc0>)

Part A: Circuit



Part B: Programing

1. Take a regular Arduino UNO and connect the VCC, GND, RESET, and RX pins of the two Arduinos (your breadboard version and the regular Arduino UNO). Then program as you would normally do on your laptop using Arduino IDE and upload the sketch. This will install the program in both Arduinos.
2. (If the above fails) Take a regular Arduino UNO and connect the VCC, GND, RESET, RX, and TX pins of the two Arduinos (your breadboard version and the regular Arduino UNO). Carefully take out the ATmega chip from the regular Arduino UNO using a chip remover tool. Then program as you would normally do on your laptop using Arduino IDE and upload the sketch. This will install the program only in your breadboard Arduino.
3. To play a note, you need to use Arduino's built-in method `tone (PIN, FREQ, DURATION)`, which plays a tone at the given frequency `FREQ` (hz) for the given duration `DURATION` (ms). Note that the function returns immediately although the note continues to play until `DURATION` ms. Hence, to create an actual pause of `DELAY` (ms) after playing a note, you need to add your own delay as this: `delay(DURATION + DELAY)`.