Project Proposal

Digital Voice Recording with Z8

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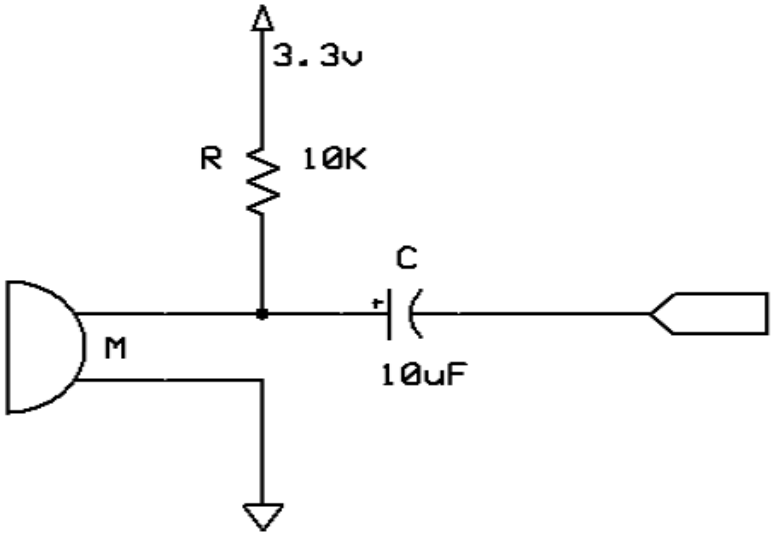
Abstract

For my final project I created a digital voice recorder using my Z8 encore evaluation board. The problem of digital voice recording and playback introduces an engineer to many different concepts. The overall process of digitizing an analog signal, storing a digital representation and finally reconstructing an analog signal can be attacked with more than one technique. I look to explore more than one approach. Mainly, I look to examine pulse width modulation (PWM) for sound creation and 1-bit audio. For both of these techniques there are many parameters that can be tweaked to increase performance. This project can also be a fun test bed for simple RC filters.

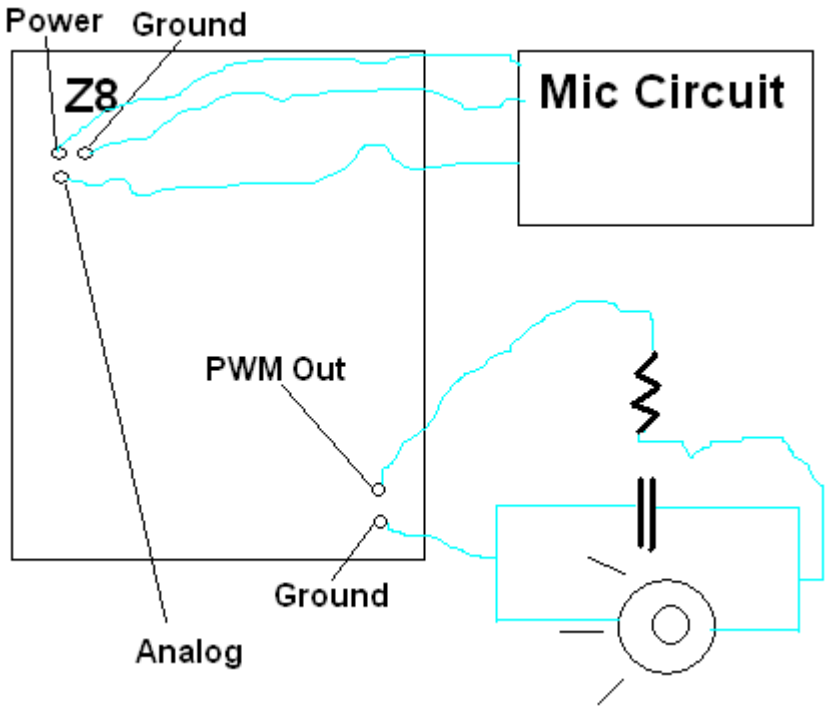
Strategy

As stated in the abstract, I am approaching the problem with two techniques. The first is pulse width modulation and the second is 1-bit audio. The two approaches have some overlap. The plan is to encapsulate repeated behavior in their own .c file. For example, both techniques use the on-board ADC. All ADC code will be placed in a separate .c file. The same goes for button and LED interactions. For the buttons and LED array, I will reuse .c files from previous labs.

A circuit design for the microphone has been given to me from the professor. The circuit provides power and causes the microphone to produce results in a range that the Z8 analog input pins can read. I will also design a very simple RC circuit to “smooth” the sound. I may find I also need the filter to remove some noise.



I can use the on-board 3.3v power pin to provide power to the microphone. To read the microphone, I will set a pin to analog input. The output pin will be controlled by the PWM timer. For 1-bit audio, I will just set the output pin to a regular output pin (not a timer). I will set a timer to create an interrupt which I will then write either '0' or '1' to the pin. For 1-bit audio I will use the formulas at http://centauri.ezy.net.au/~fastvid/picsound.htm to determine the resister and capacitor values.



Unknowns

I have not used the on-board ADC yet. I have only produced sound with a continuous timer by

manipulating the timeout. I have never worked with a microphone but I examined the output through an oscilloscope and it looks readable.

Resources

2 Capacitors
2 Resisters
1 Breadboard
1 2-wire microphone
1 Z8 class board
    -On-board ADC
    -On-board PWM Timer