Executive Summary:

Device takes in audio input through microphone and passes it through multiple filters to modify sound output. This device is perfect for a kids toy, hobbyist's kit or as a costume prop.

Brief Market Analysis:

Device to ideally be marketed to children, hobbyists and audiences of all ages to be used as a costume prop.

Device should be sold for $15-$20 as comparable options are offered at about the same price. All competition seems to offer fairly similar product, so no frontrunners. Device parts should be ordered in bulk to help recover production and labor costs. Cheaper parts or alternative production methods may want to be considered to avoid loss of profit.

Requirements:

MUST

1. Sample sound through a microphone
2. Interpret data from analog to digital, with some degree of high frequency (100kHz) sampling
3. Transform sound to something different and output to speaker

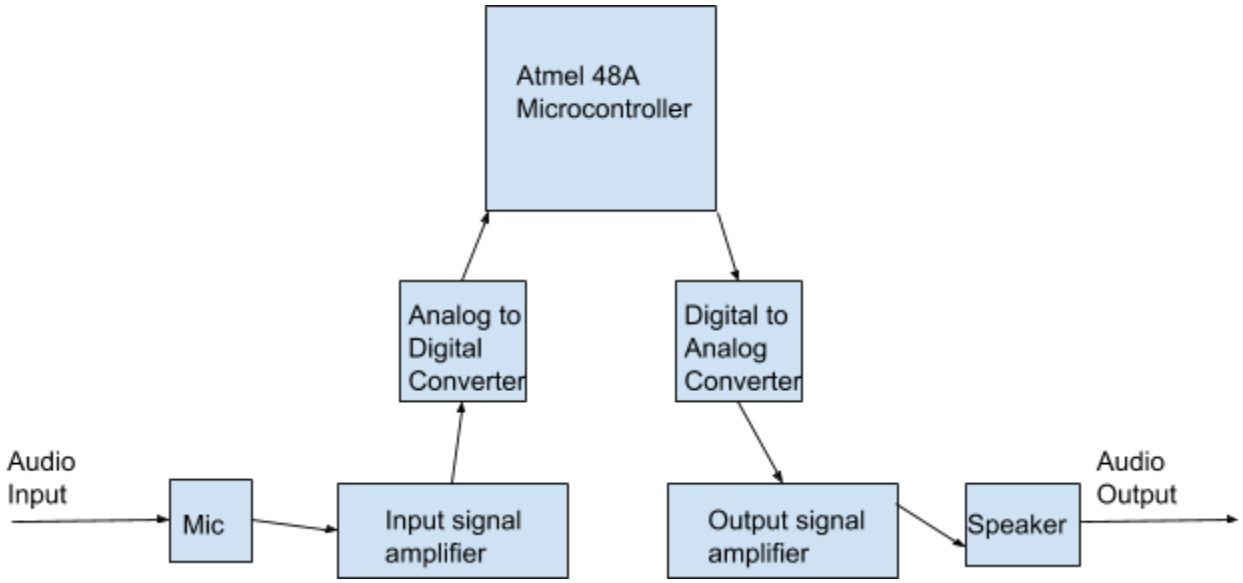
SHOULD (would be nice but won't be detrimental if it doesn't work)

1. Have multiple transformation options
2. Be able to interface with multiple types of microphones

MAY (optional and additional things to make it fancy)

1. Transform sound using the microcontroller
2. Provide live graphing of input sound
3. Record sound and save to file

System Architecture:



Design Specifications:

- Processor: Atmega48A Microcontroller
- Sensor: HUACAM YYPJ-01-1 Microphones
- Actuator: 8 ohm Speaker
- CP1-3523N-ND Microphone jacks
- ISP communication through Atmel Studio directly to Atmega48A
- MCP3208 Analog to Digital Converter
- MCP4921 Digital to Analog Converter
- Design Environment: Atmel Studio