

## "TAKPAD" Block Diagram

### Authors

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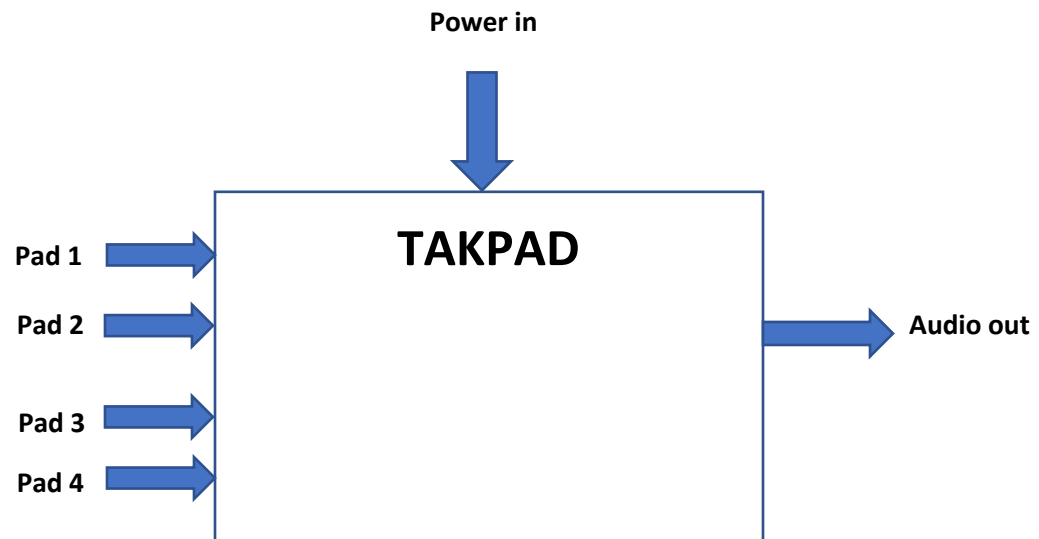
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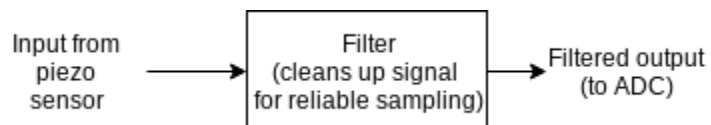
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## High Level Block Diagram

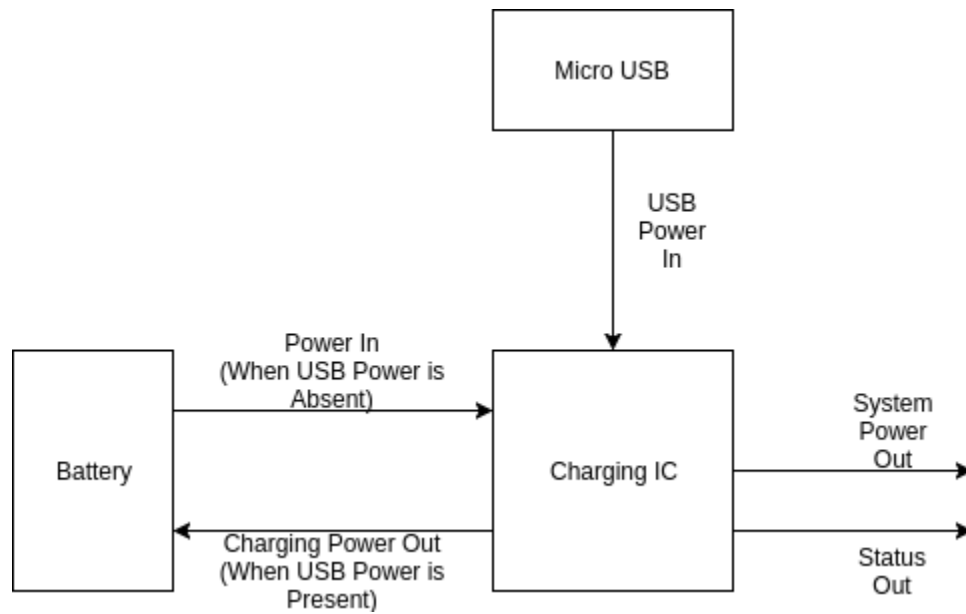
### TAKPAD



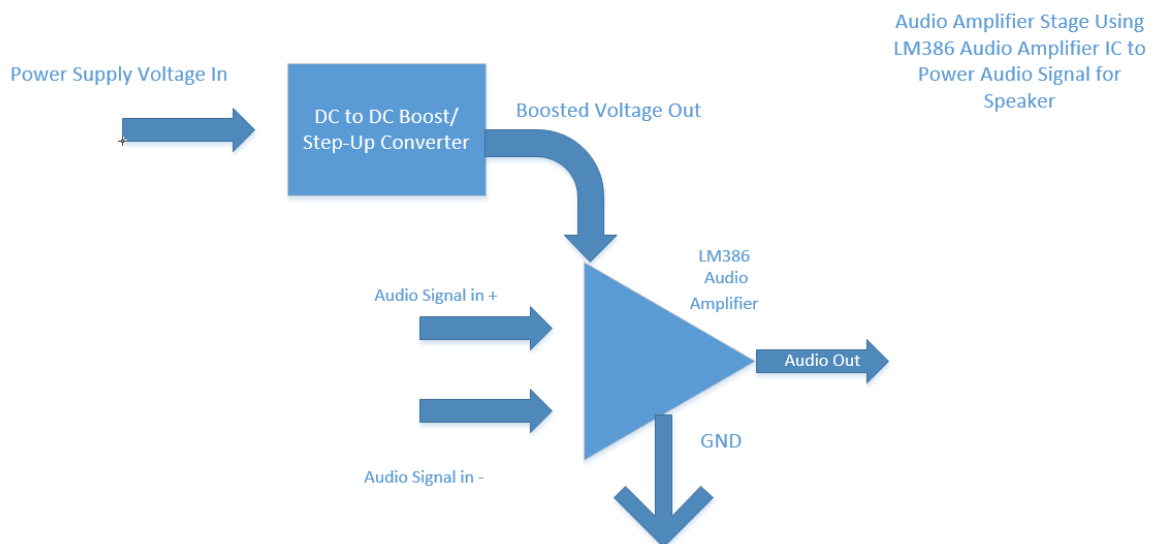
### Input Filter



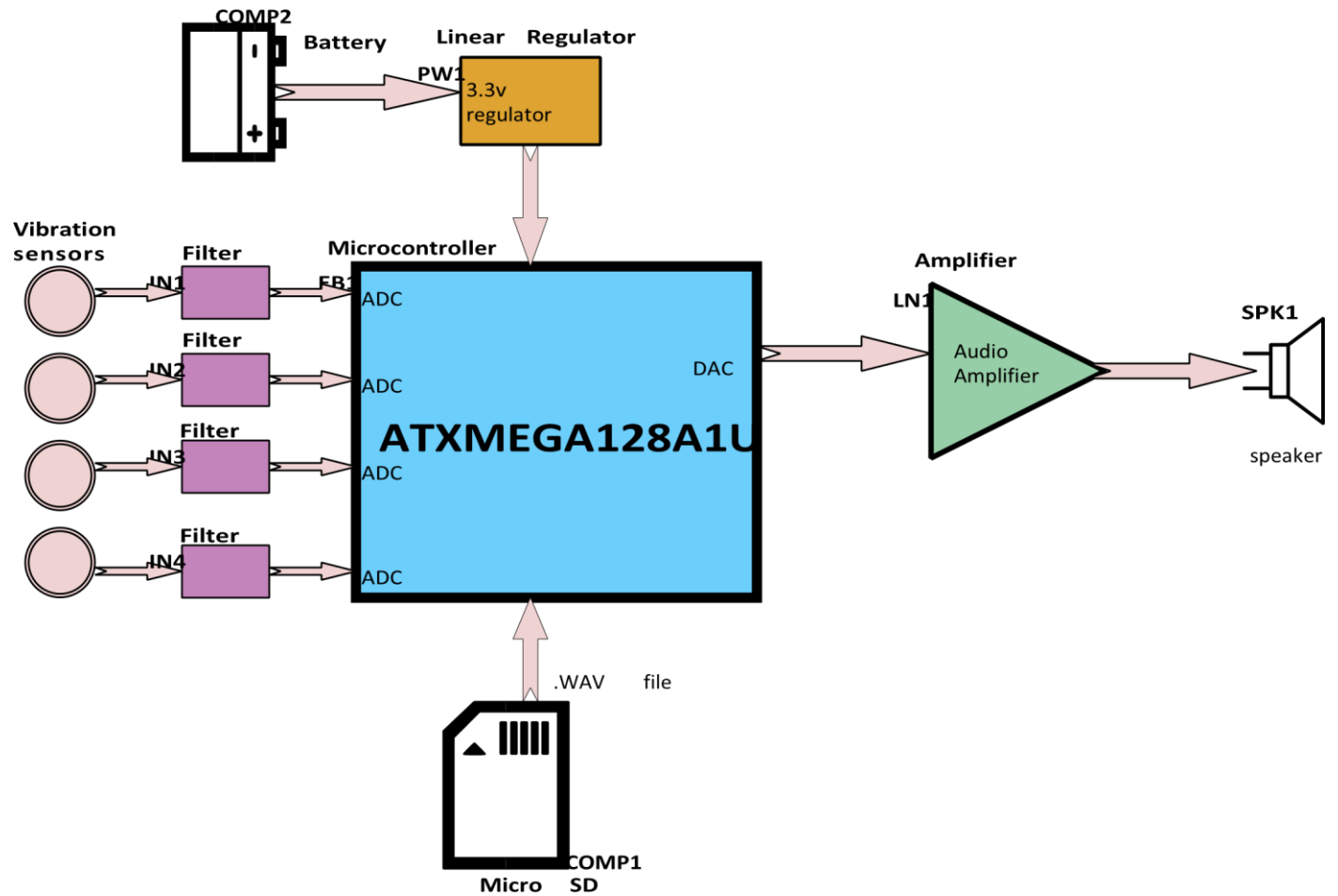
## Power supply



## Audio amplifier



## Detailed Block Diagram



### **Vibration sensor (piezo element)**

**Input:** Push or press the piezo element

**Output:** Analog voltage wave

**Functionality:** The piezoelectric element generates voltage when deformed. It basically measures change in pressure, strain or force by converting the mechanical change into electrical charges. The bigger the applied force, the higher the voltage output's amplitude.

### **Pre-filters**

**Input:** voltage output from the piezo element

**Output:** Filtered voltage output that looks like an analog pulse.

**Functionality:** the pre-filter is designed to remove the high frequency components of the sensor output and regulate the output voltage into 3.3V level. This would make it easier to process the output signal from the sensor in the microcontroller.

### **Microcontroller(ATXMEGA128A1U)**

**Input:** Analog voltage output from the filters and **.wav** files from MicroSD

**Output:** processed **.wav** signal into audio amplifier.

**Functionality:** the microcontroller outputs a unique processed **.wav** file based on the magnitude of the vibration. Change in the magnitude of the applied force on the sensors would result an altered pitch version of the **.wav** file.

### **Audio amplifier**

**Input:** **.wav** file from the microcontroller

**Output:** amplified **.wav** signal into speaker

**Functionality:** the amplitude of the **.wav** signal from the microcontroller is small, so the audio amplifier will amplify the signal with high gain so that the **.wav** signal will be audible to a room of audience.

### **Speaker**

**Input:** **.wav** signal from the Audio amplifier

**Output:** sound wave that is audible to the human ear

**Functionality:** the function of the speaker is to convert an electrical signal into sound wave.

**MicroSD**

**Input:** N/A

**Output:** .wav files into the microcontroller

**Functionality :** it is the source for the .wav files that will be accessed and processed by the microcontroller

**Rechargeable Battery:**

**Input:** Battery charger when it run out charge

**Output:** 3 – 4 Volts into the regulator.

**Functionality:** it is the power supply for the **TAKPAD** board.

**Voltage Regulator:**

**Input:** 3 – 4 volts from the battery

**Output:** 3.3 volts into the microcontroller

**Functionality:** it regulates the voltage from the battery into the proper rating for the microcontroller.