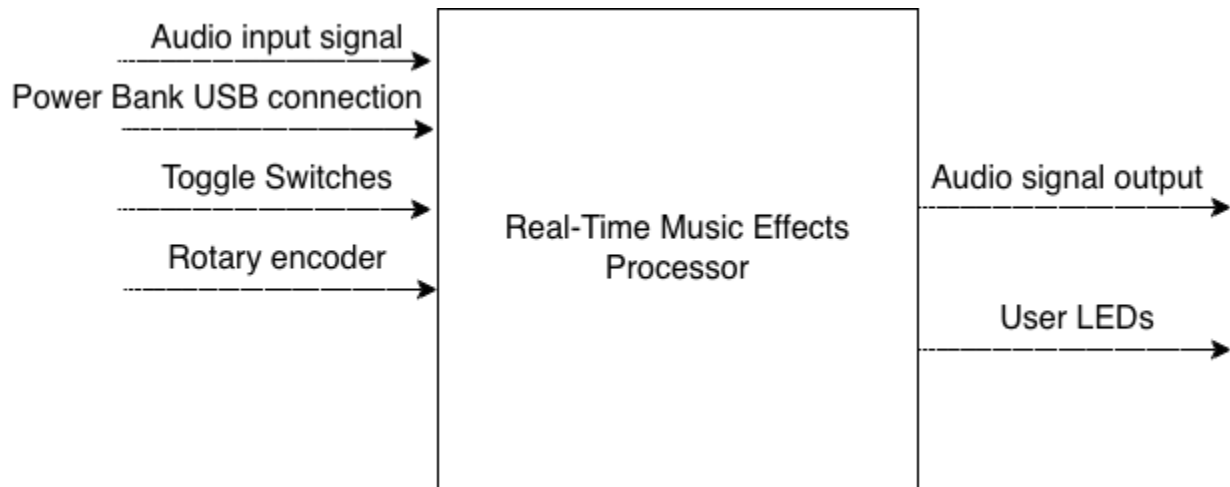


Team #6
 Antonio Hernandez Olivares
 Cesar Chich-Saquic
 Fedya Henrichs-Tarasenkov
 Rafael Cervantes

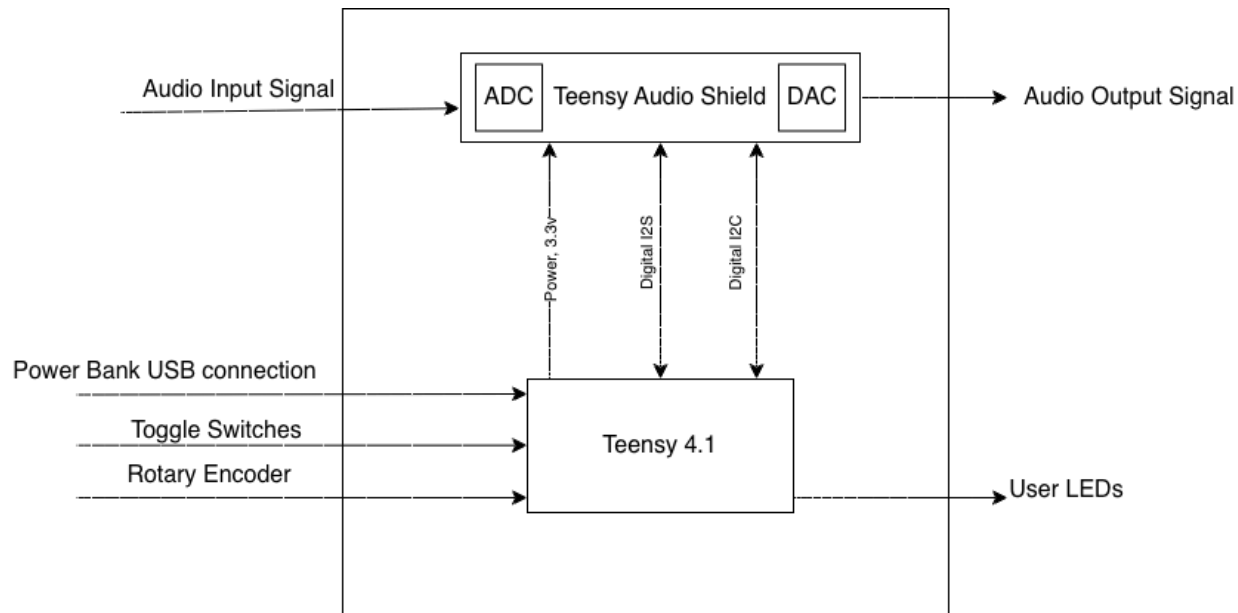
Functional Decomposition

Real-Time Music Effects Processor: Level 0

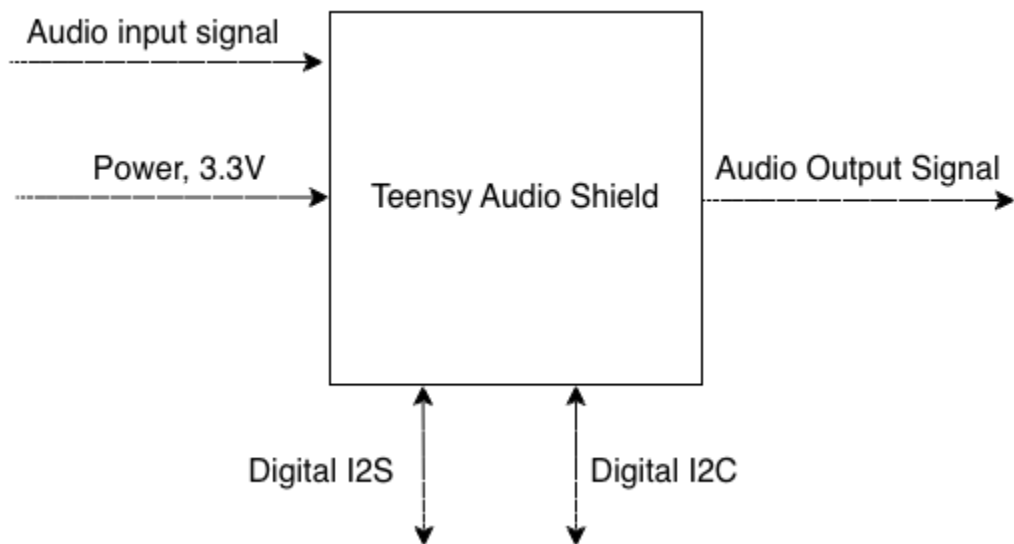


<i>Module</i>	Real-Time Music Effects Processor
<i>Inputs</i>	Audio Input Signal: 3.5 mm audio jack input from phone/other device Power Bank: USB connection directly to Teensy 4.1, 5V Toggle Switches: Simple on/off switch for each audio effect Rotary Encoder: User controlled amount for each effect
<i>Outputs</i>	Audio Signal Output: 3.5 mm audio jack output to speaker/headphones User LEDs: LEDs that show which effect is on
<i>Functionality</i>	Takes in a user's audio input signal and applies different effects. Users can toggle each effect to be on one at a time or multiple and can use the rotary encoder to increase/decrease the strength of the applied effect. User LEDs toggle on/off with the effects to show which effects are in use.

Real-Time Music Effects Processor: Level 1



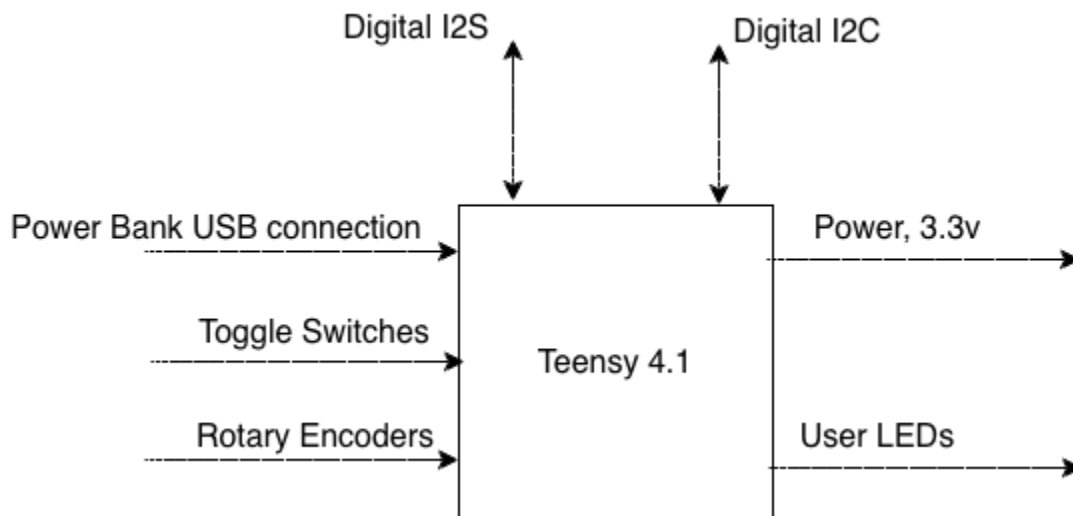
Teensy Audio Shield: Level 1



Module	Teensy Audio Shield
Inputs	Audio Input Signal: 3.5 mm audio jack input from phone/other device Power 3.3V: From Teensy 4.1
In/Outs	Digital I2S: Digital Audio Data communication with the Teensy 4.1 Digital I2C: Digital Control communication with the Teensy 4.1

<i>Outputs</i>	Audio Signal Output: 3.5 mm audio jack output to speaker/headphones
<i>Functionality</i>	Uses I2S communication with the Teensy 4.1 to convert incoming audio signal with its built-in ADC and convert output with built-in DAC. Maintains audio quality. Input selection and volume control via I2C interface with the Teensy 4.1.

Teensy 4.1: Level 1



<i>Module</i>	Teensy 4.1
<i>Inputs</i>	Power Bank: USB connection directly to Teensy 4.1, 5V Toggle Switches: Simple on/off switch for each audio effect Rotary Encoder: User controlled amount for each effect
<i>In/Outs</i>	Digital I2S: Digital Audio Data communication with the Teensy Audio Shield Digital I2C: Digital Control communication with the Teensy Audio Shield
<i>Outputs</i>	User LEDs: LEDs that show which effect is on Power, 3.3V: Power for audio shield
<i>Functionality</i>	Uses I2C to control the audio shield and generates I2S clocks to keep the audio signal smooth. Takes in user input control logic to figure out which effects to place on the signal. Uses DSP to place different effects on the signal before passing back to the audio shield.