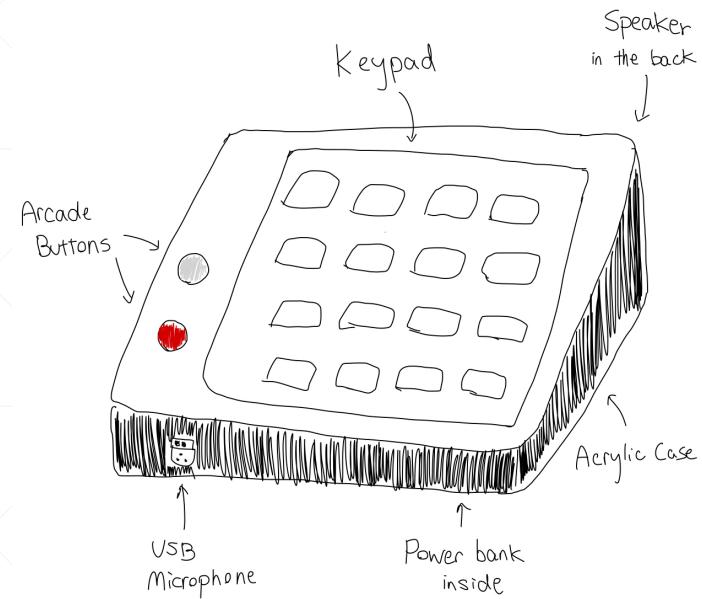


ENGI 301

mini Instrument Controller Proposal

February 19, 2024
Yuka Aoyama

Background Information



Existing Projects:

Audio recordings + playback: <https://www.hackster.io/bw21/engi-301-project-01-2577c1>

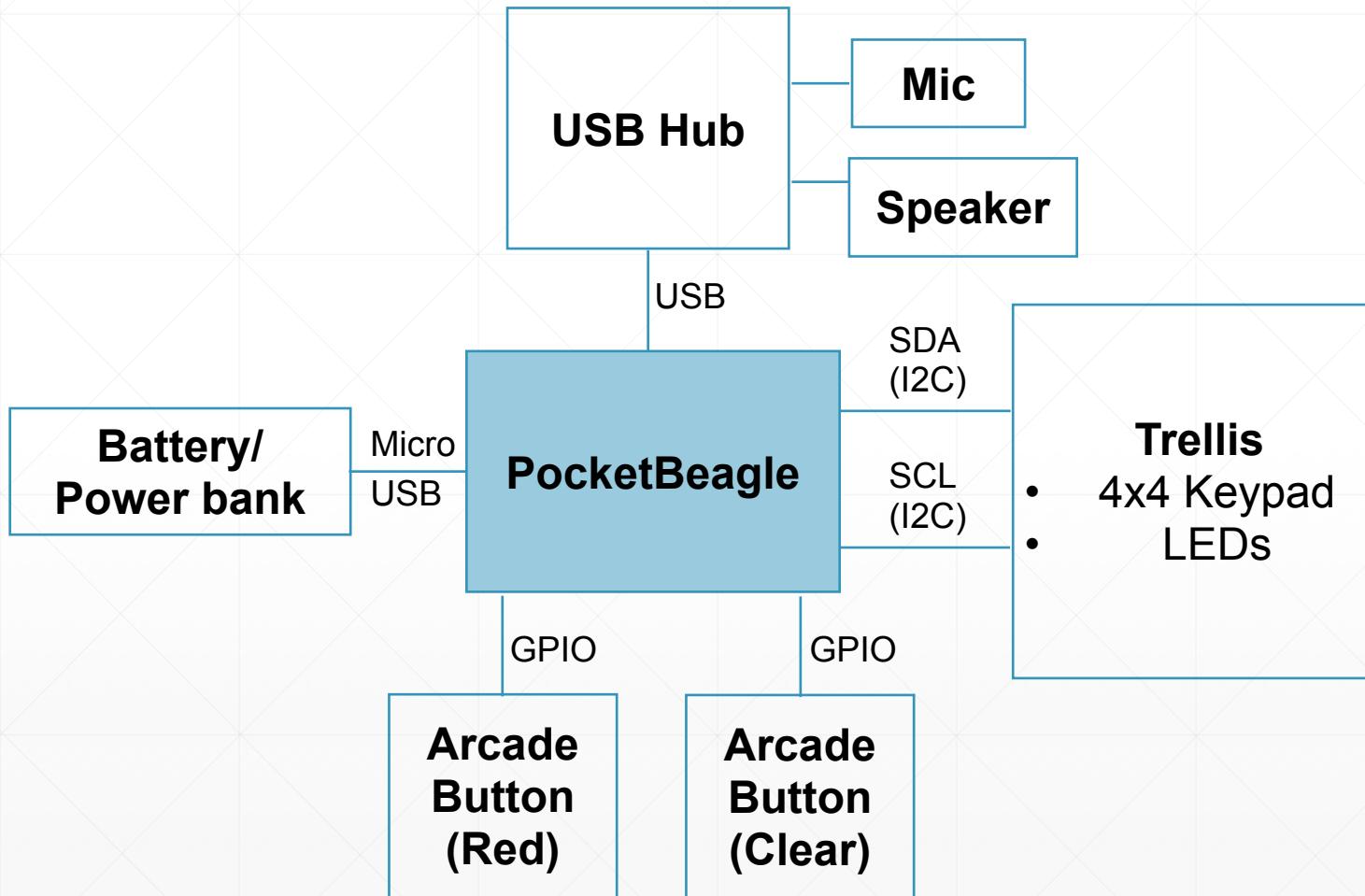
Buttons to audio: <https://www.hackster.io/gleberruyer/midi-wood-keyboard-88053e>

MIDI controller: <https://www.hackster.io/diyguyChris/arduino-midi-controller-14c40c>

Improvements and Additions:

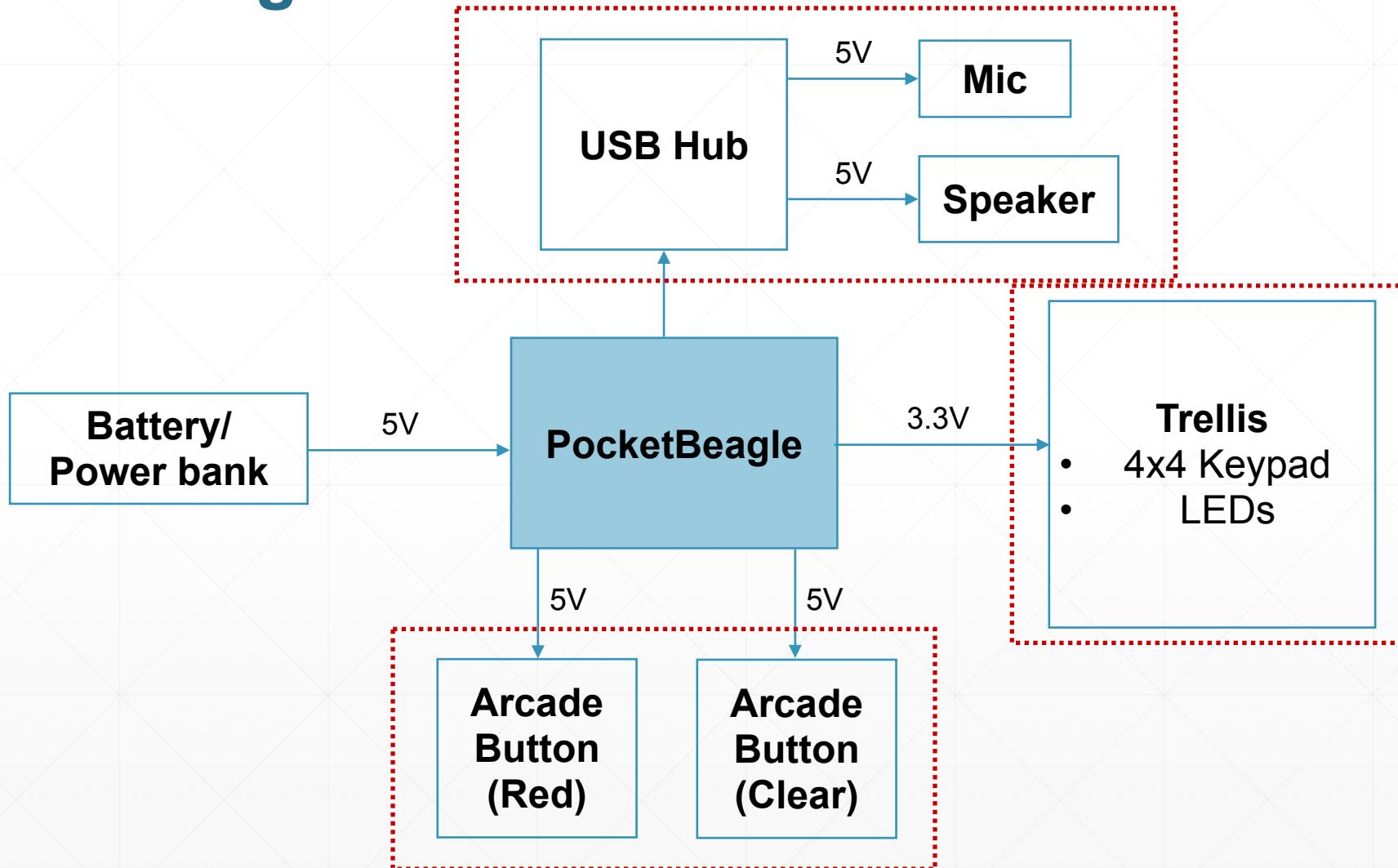
My device is designed to function as an independent musical instrument, directly playing pre-recorded sounds through its built-in speaker. Unlike a MIDI controller (most existing projects I found), which requires connection to computer software to produce sound, this device operates autonomously, eliminating the need for a computer connection. The device can also record an audio/voice through USB microphone and save it as one of the instrument buttons.

System Block Diagram



1. When the user turns the power bank on, all keys light up to indicate that the device is ready.
2. The user can press any button to play the corresponding instrument through the speaker. A piece of paper card is included with the device to indicate which button corresponds to each instrument.
3. The user can hold down the clear arcade button while pressing any instrument button to create a loop. When the user releases the button, the loop will continue to play through the speaker.
4. The button at the bottom left of the keypad is reserved for the user's own sound. The user can press the red arcade button to start or stop a recording via the USB microphone. While recording, the button will flash red.

Power Block Diagram



Components / Budget

Component	ENGI301 to Buy?	Cost
USB Speaker (On the spreadsheet, https://www.amazon.com/Computer-Speaker-Enhanced-Portable-Windows/dp/B086JXJ1LF)	Yes	13.98 (with \$2 off coupon)
PCB for 4x4 Keypad (https://www.adafruit.com/product/1616)	Yes	10.95
Portable Charger (https://www.amazon.com/SIXTHGU-Portable-Capacity-External-Indicator/dp/B08QHG7BTB)	Yes	7.99
USB Microphone (On the spreadsheet, https://www.amazon.com/gp/product/B01MQ2AA0X)	No	7.56 (with 5% discount)
USB Hub (https://www.amazon.com/Adapter-Splitter-Expander-MacBook-Notebook/dp/B0BD4549Q3)	No	5.99
Silicone 4x4 Button Keypad (https://www.adafruit.com/product/1611)	No	4.95
Arcade Button with LED (Red) (https://www.adafruit.com/product/3489)	No	2.5
Arcade Button with LED (Clear) (https://www.adafruit.com/product/3491)	No	2.5
Laser cutting / Acrylic	No	OEDK
3mm LEDs	No	OEDK

Total for the 301 budget: \$32.92
Total for myself: \$23.50

Component Selection (Remove slide for submission)

- All components must be from either: Amazon, Adafruit, Sparkfun, Digi-Key, or Mouser
- Select no more than two (2) components that are not on approved component spreadsheet
 - See Canvas → Files → assignments → ENGI301_project_01_parts_list.xlsx
 - If there is a cheaper part that you would like to use, we can discuss in the project meeting
- All components needed for the project should be listed on Slide 5
- All components should have links to the website where they can be purchased
 - Please trim URLs for links to Amazon
- ENGI301 will supplement \$25 to \$35 dollars for components
 - Please indicate what components need to be purchased by ENGI301

If you have a special request, we can discuss in the project meeting