

WubSuit.

A MIDI-compatible digital body suit inspired for the dubstep genius in all of us.

Intro

We wanted to create a musical suit that could enable a user to create music in a unique way by moving parts of their body. Employing a variety of electronic sensors, we could control MIDI data to be interpreted at the base station to create seemingly any sound imaginable.

Problem

- (1) Needed a way to collect all of the data from the electronic sensors and emit them back to the base station.
- (2) Technically difficult to create synchronization of EL wire to music.
- (3) Hard to process variety of sensor output into understandable MIDI format for computer.
- (4) Needed a way to visualize incoming data stream to validate sensor output.

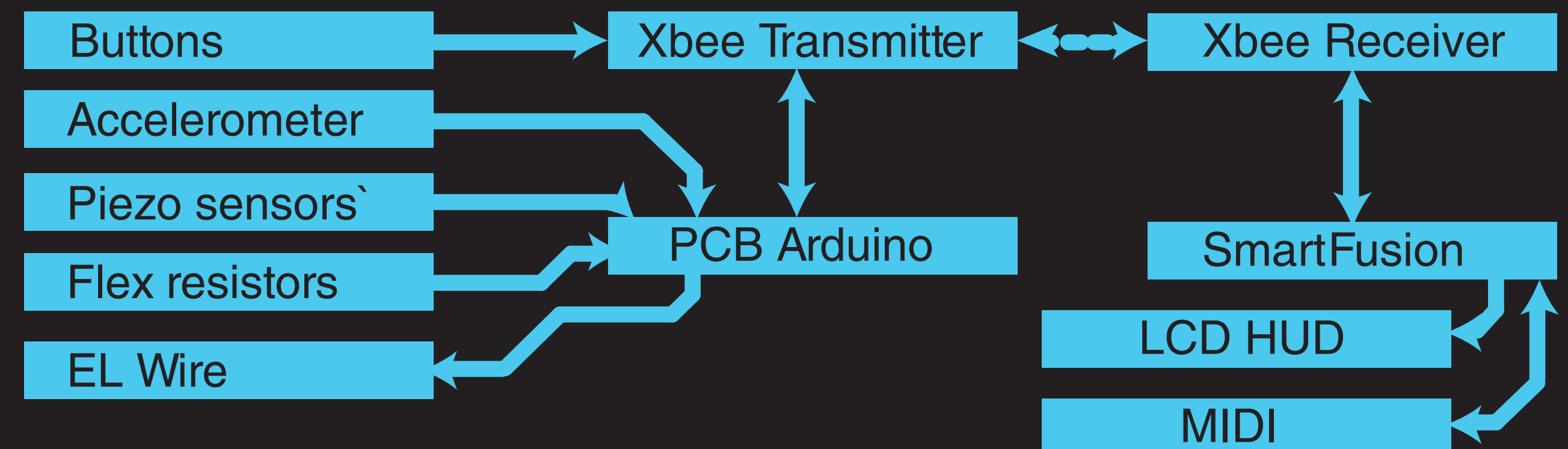
Solution

- (1) We created a custom PCB that gathers the Piezo, Flex, Ultrasonic, button, and accelerometer data and sends it over Xbee to be interpreted at base station.
- (2) This module also gives commands to the EL wire module to dictate which light channels should be on at a given time, based on the beat of the music.
- (3) A mixture of custom FPGA hardware and ARM software filters the incoming data and maps specific events to specific MIDI outputs.
- (4) A LCD display is used to visualize MIDI output that our device produces. Timer interrupts are used to mitigate buffer overflow issues. Features navigable menu system controllable by buttons.



Communication & Sensors

Xbee modules on both ends of the system (suit and receiver) provide all data communication for the above sensors.



Some minimal pre-processing is done via an onboard Arduino microcontroller, but all real processing is done on the SmartFusion.

Button events function as interrupts on the Xbee line, and are then picked up on the receiving module, emulating the input pin.

Hardware & Interfacing

Accelerometer and PCB

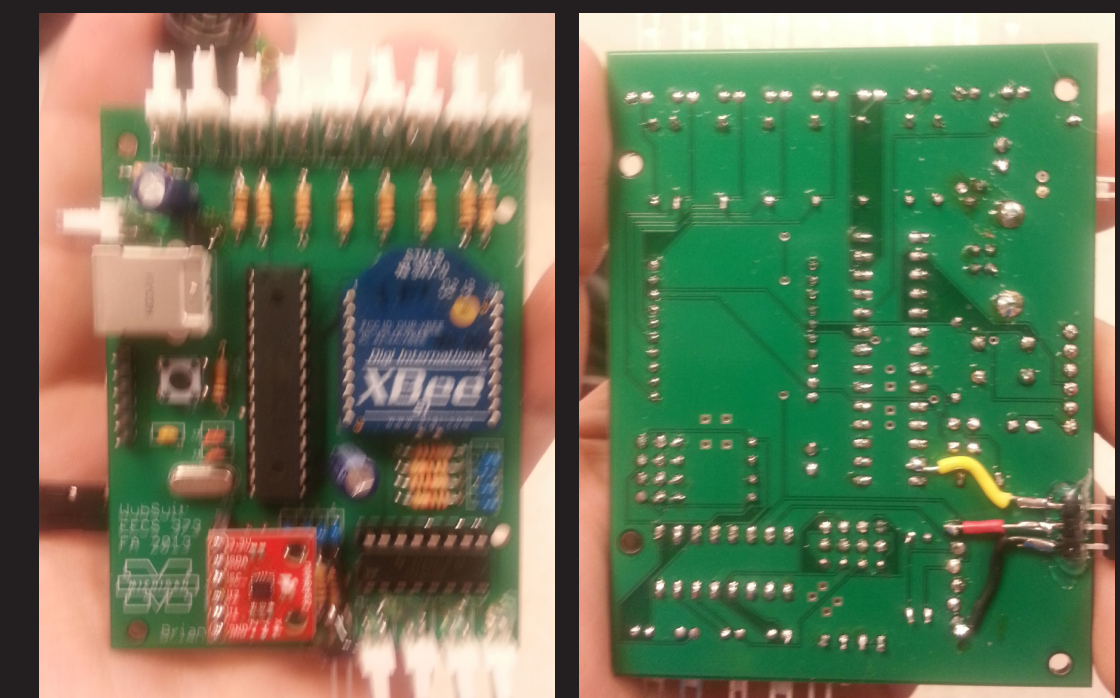
Ultrasonic distance sensor / Button

Flexible resistors

Piezo knock sensors

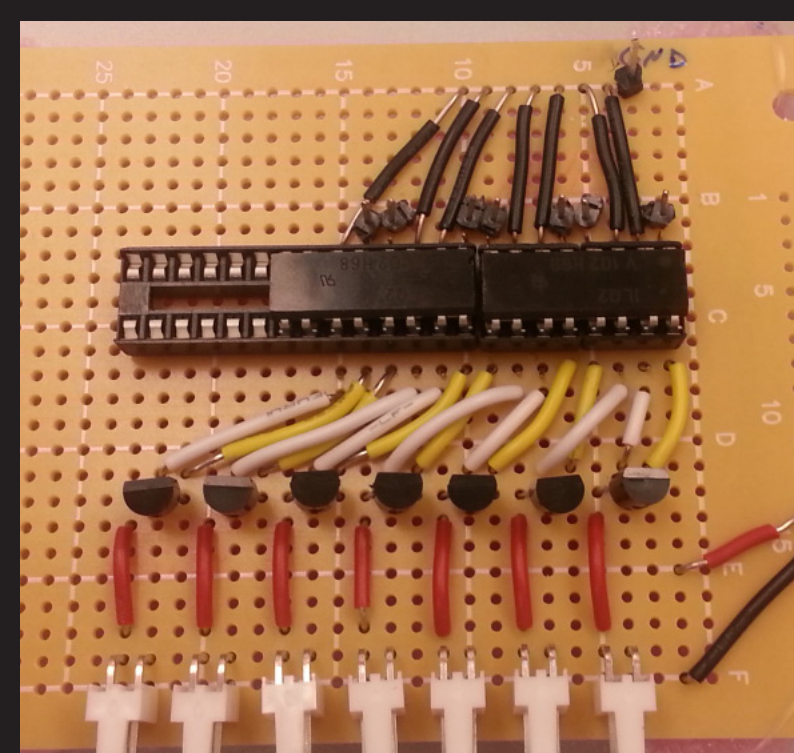
A plethora of sensors on the suit provide the user with various MIDI control options while manipulating music notes and beats.

Custom PCB

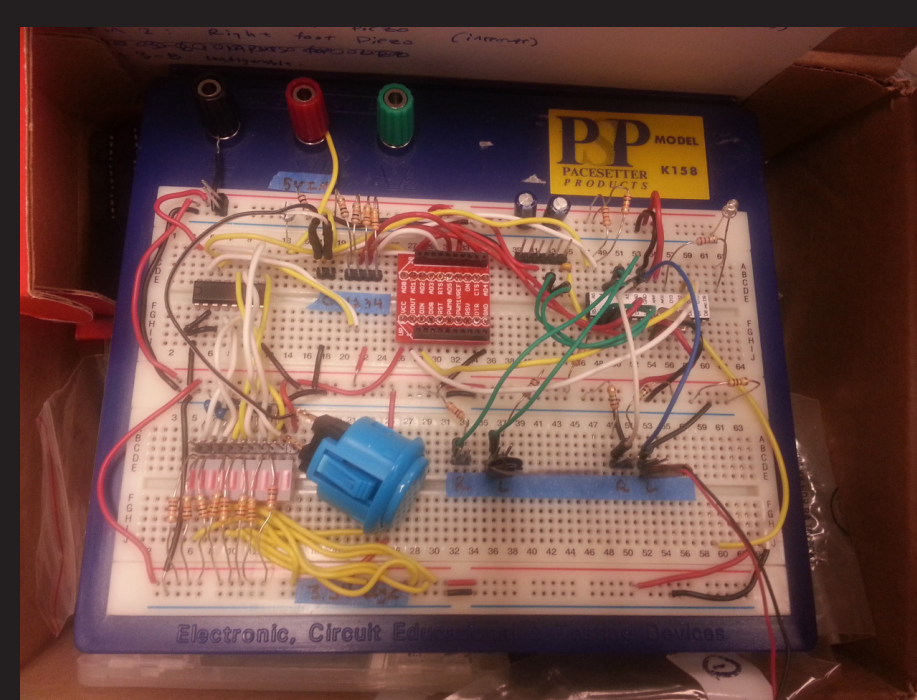


The WubSuit features a one of a kind hand-built body suit with EL wire for the classiest of MIDI-needed events. With wireless communication and batteries, there's no need to be teathered to your system to control a crowd.

EL driver circuit



Breadboard test suit PCB

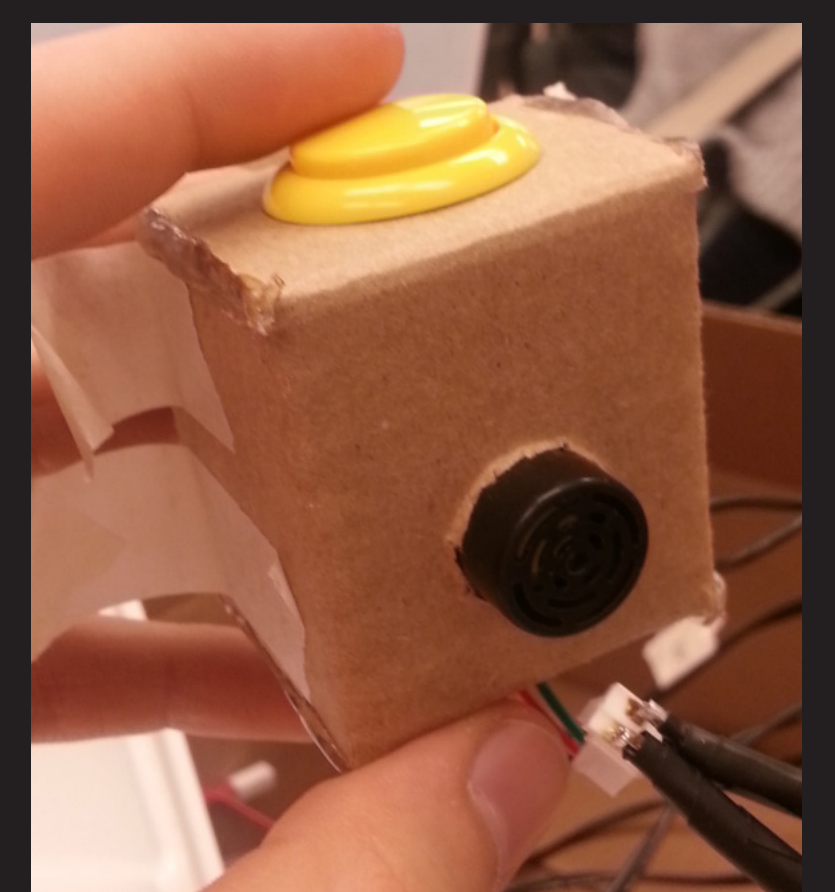


Prototypes

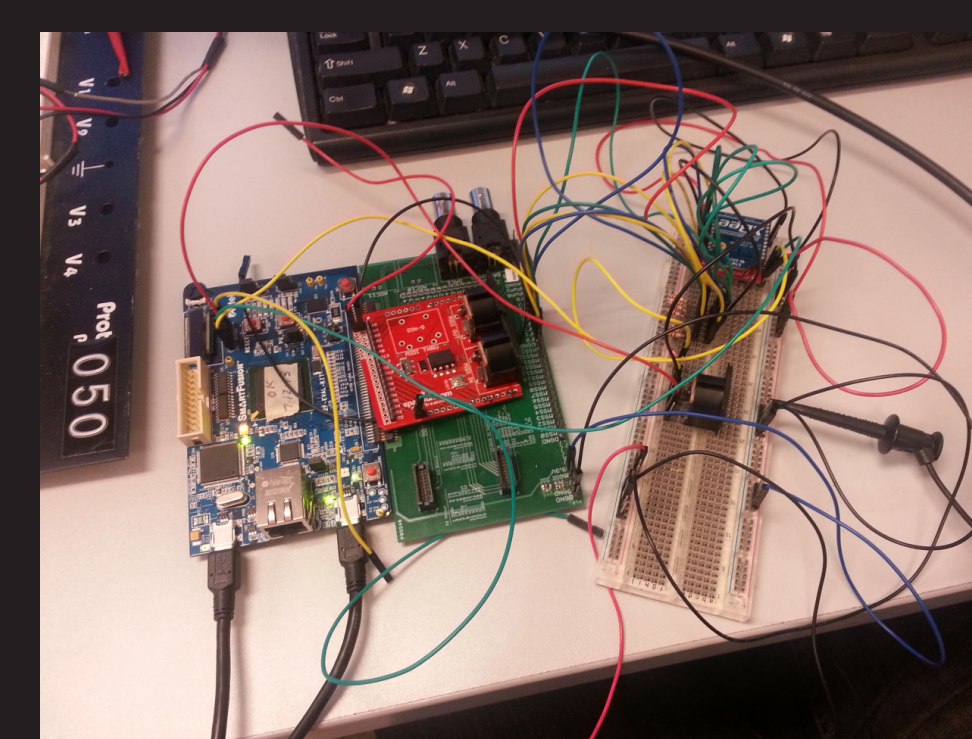
Helmet Revision 1



Capture note button



MIDI Processor



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<https://github.com/bridadan/WubSuit>

<http://youtu.be/>

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Suit image courtesy of:
Iain Claridge Design