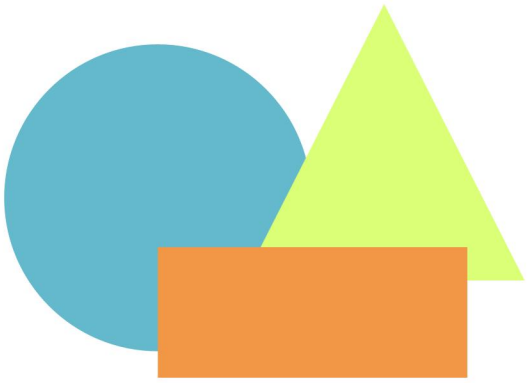


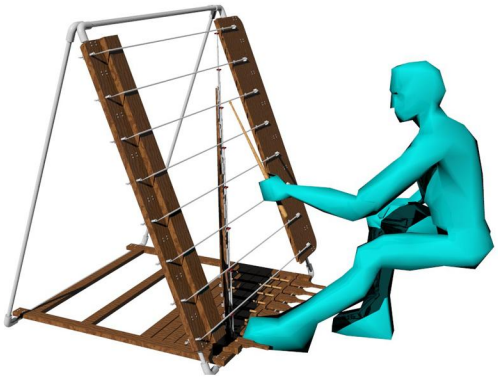
Creative Engineering Portfolio

All projects designed and built solely by me

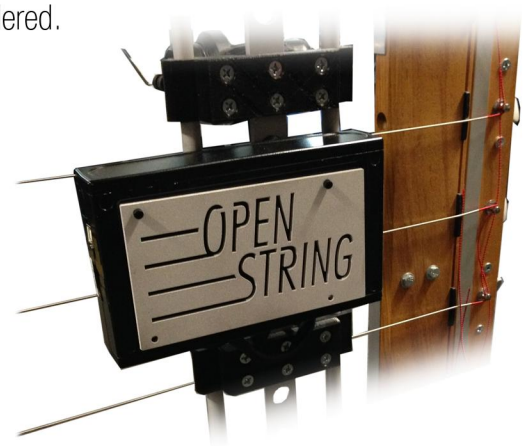
Jason Jahnke
09.20.2017

Robotic musical instruments

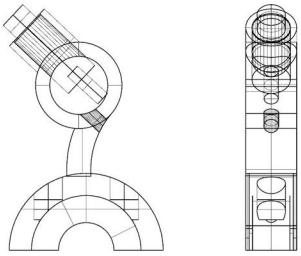
open string



The Open String is a 12 string industrial strength harp that can be played via onboard solenoid beaters or by one or more people. It features a 12 channel (dodecaphonic) pick-up system. It can be quickly dissaembled for transport, fitting in any standard or compact car. The pick-up and solenoid rails are removeable, being attached by neodymium magnetic couplings. It is composed primarily of ash wood and aluminum. Ash was chosen for its strength and rigidity, which was important when the collective tension of the strings is considered.



aquaharp 1



Solenoid bracket design

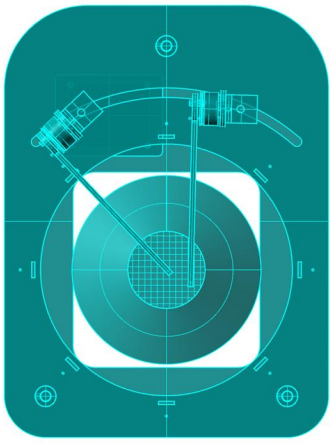
The Aquaharp emerged from an appreciation of the elegant shape of wine glasses. Each of the eight wine glasses is tuned to a pitch by filling it with a certain amount of water, from there the glasses are struck by tiny solenoids, creating an ambient, clinking composition. It is composed primarily of aluminum and glass.

aquaharp 2

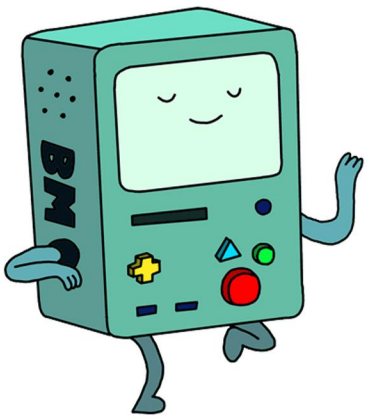
Aquaharp 2

The Aquaharp 2 picks up where the first Aquaharp left off, addressing numerous design and functional deficiencies. It is louder, bigger, more easily portable. It also looks like it was designed by Apple. And it is built to last. It features a redesigned striker, integrated carry handle, wireless control via Bluetooth modules, and cradles each wine glass in a way that maximizes the sound produced, extracting as much volume and clarity of tone as possible. The instrument actually comprises two identical halves, bringing versatility to the device by making it possible to only bring one half to a performance if necessary.

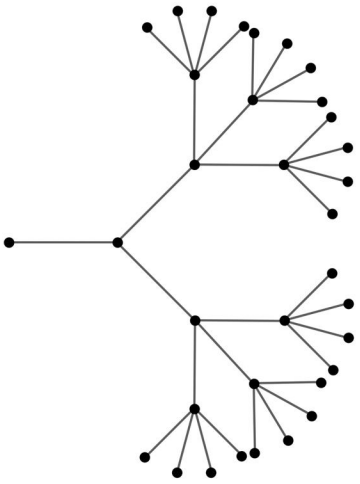
small gong bot



Small Gong Bot was designed to be diminutive and cute. Its small, squat stature was inspired by things like an old light meter, the Adventure Time character B-MO, and an Apple Macintosh 128K. The challenge was to get the solenoids to strike hard enough to produce the traditional Chinese small gong's unique rising percussive tone. It was made in glossy black acrylic in order to accentuate the gold/brass color of the gong.

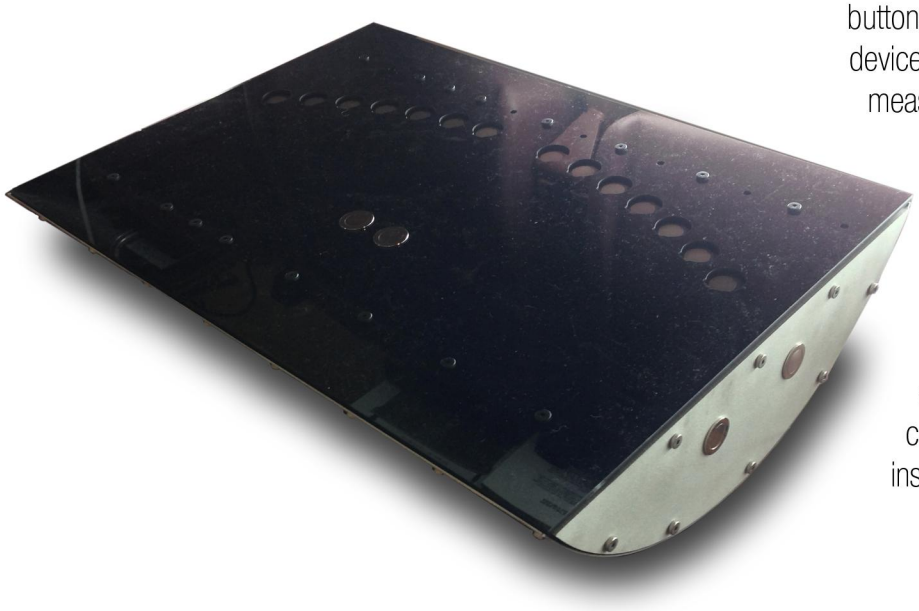


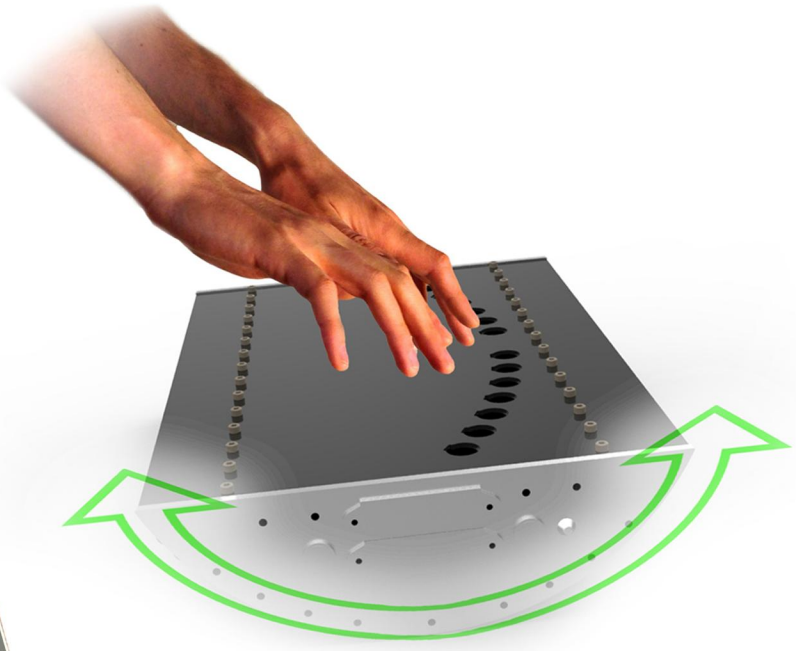
Interfaces for expanding musical expression



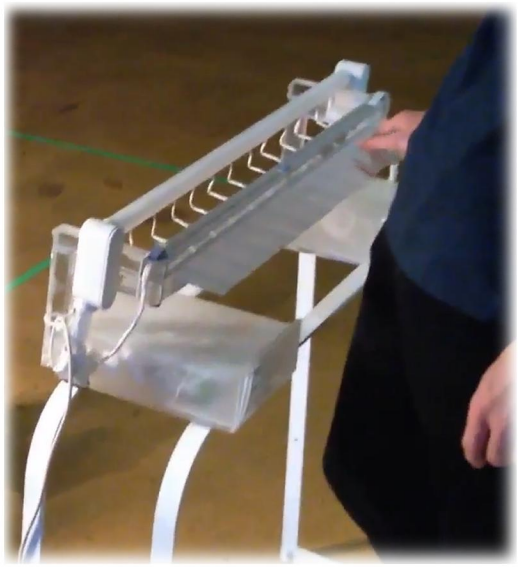
rockboard

The Rockboard is a MIDI and OSC based controller. The primary mode of expression are the fourteen force sensing resistors on top (used as either buttons or continuous controllers) and tilting the device back and forth. An accelerometer is used to measure the tilt of the device. Inside, two center weights give feedback when tilting (tilting more makes a user feel the weights more) and also return the Rockboard to its resting position. It is composed of aluminum and acrylic. It was designed to fit programmatically, expressively, and aesthetically with the Aquaharp 2, thus creating a holistic system, an utterly new instrument and an intuituve means to play it.

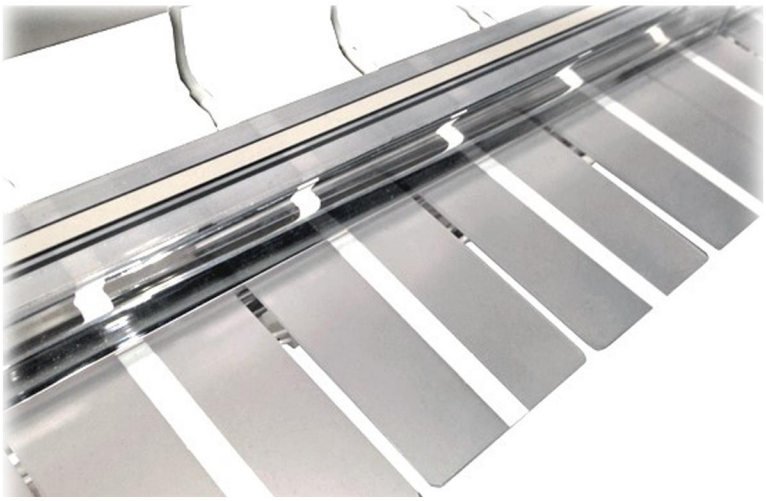


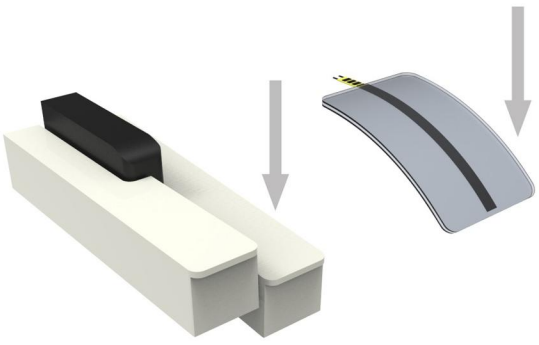


flexichord



The Flexichord uses bend sensors, a type a variable resistor, sandwiched between flexible plastic cards. There are twelve arranged in a keyboard fashion, allowing for discrete and continuous control. The style of the device was borrowed from the acrlyic iMacs of the early 2000's, which in turn trace their lineage to Dieter Rams' work for Braun in the 1970's. The device is made entirely of acrylic.

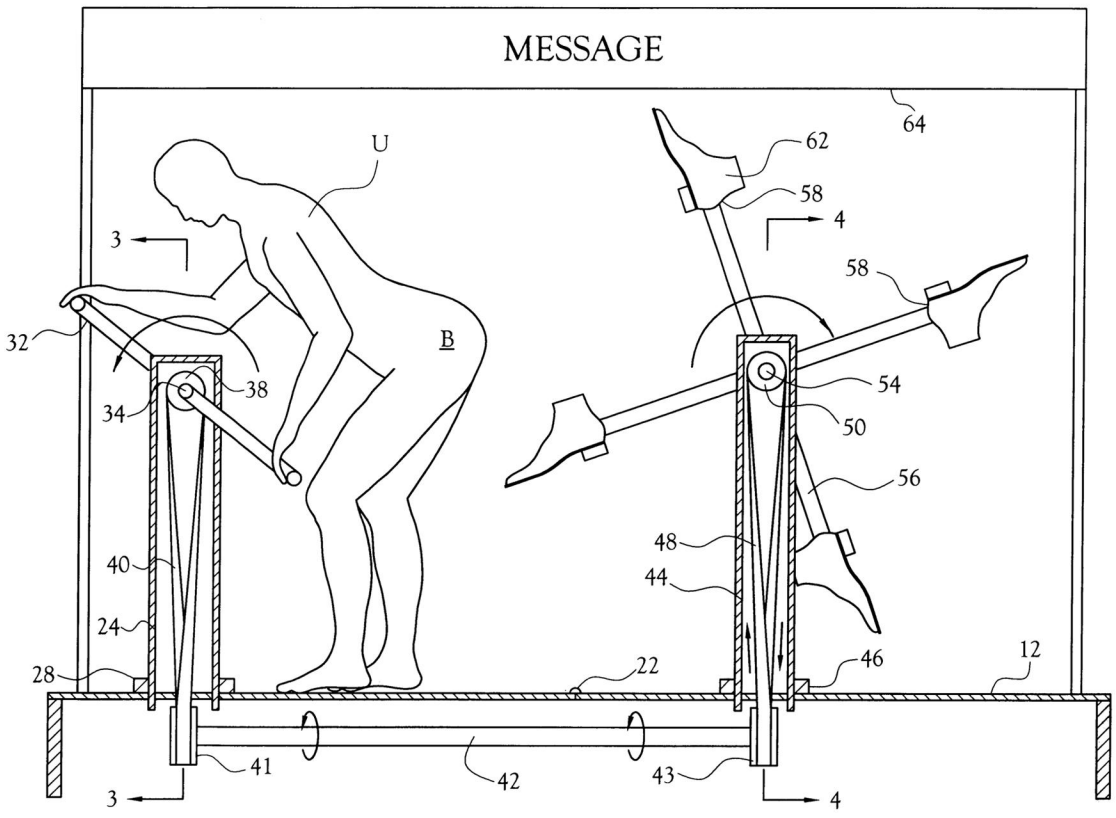




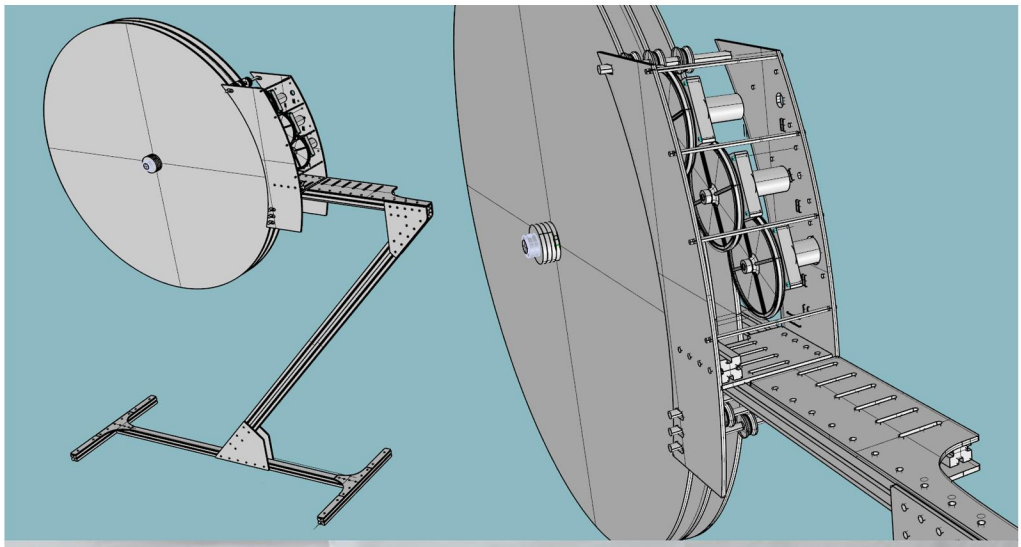
audioloom

The Audioloom is built with a rough hewn, modernist aesthetic. It folds flat for transport and features eight membrane potentiometers, essentially long touch strip sensors. It is composed primarily of aluminum with a black walnut enclosure for the electronics.

Almost practical items



4D tondo



A tondo is a circular canvas. The 4D tondo was made for the artist Cori Redstone, so that she could conceive a painting in four dimensions, namely three layers that rotate at varying speeds with time being the fourth dimension. It is a dual cantilevered design featuring two clear acrylic discs three feet in diameter and one light weight canvas covered disc in the rear postion. The speed of each motor can be dialed all the way from a slow crawl to a rapid spin. Despite the trouble it took to make, no one has yet to purchase it for the asking price of 25,000 USD.

tensile display

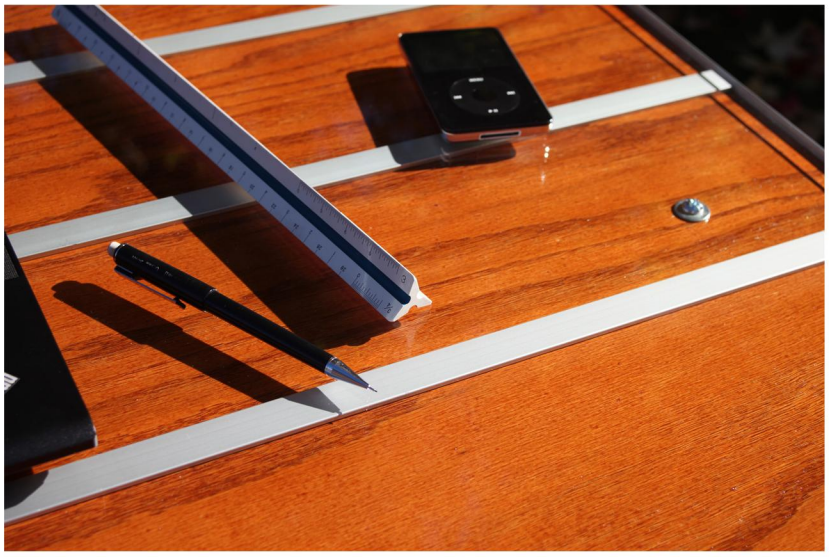
This display was designed to convey the idea of toughness and durability of a pair of wood composite eyeglasses. It is made of laser cut bamboo ply and laser cut and engraved acrylic. The eyeglasses are held in place by six thick threaded rods and the acrylic front part displays facts about the durability of the eyeglass frame. The crown logo at the bottom is lit by diffuse LED light, powered by two coin cell batteries held within the threaded rod mounting bracket. The design goal was to capture a modern, industrial, no nonsense look.

squeeze display

Another eyeglass display, this time utilizing a linear actuator and vintage wood clamps to squeeze the frame of the eyeglasses, demonstrating their durability. It's programmed with three modes: manual, which allows it to be moved up or down, automatic, which squeezes the frame in a continuous loop, and partial auto, which activates a single squeeze when the action button is pressed. The four buttons on the side control everything. A switch case was used to structure the arduino program. The enclosure is oil finished birch plywood. The linear actuator mechanism was left partly exposed to entice onlookers.

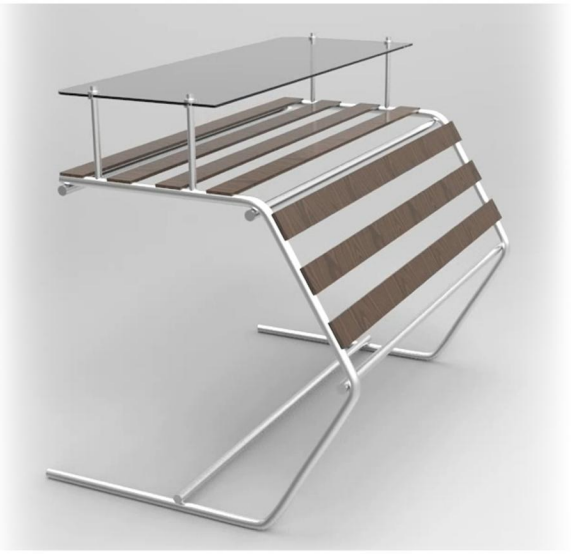
edge desk 1 (ed-1)

The Edge Desk 1 is made of aluminum, two steel rods, redwood veneered ply, and a glass top. The glass top sits off the ply, leaving about a half inch gap. This produces a nice layered effect when items are placed on it. There are three strips of aluminum going across the ply. This was done to give some perspective and scale to the desk, so that as you sit at it, the surface doesn't seem like one vast, unbroken expanse. This was the first piece of furniture I built.



kneeling desk 1 (kd-1)

The Kneeling Desk was designed for use with a Balans kneeling chair. It has an upper surface at hand level and a lower surface for storing papers and notebooks. The glass is tinted grey and the wood is oil finished yellow heart. The style in mind during construction was mid-century meets Japanese. The cantilevered structure utilizes welded steel tubing. This was my first welding project.



Lexus 4D simulator

This interactive VR/AR experience was created for the 2017 Long Beach Grand Prix. I prepared the drawings and CAD files for the entire structure including the roll cage and front shroud.