

PORTFOLIO / 2026

Chip Trigger

A Gestural
MIDI Controller

体感 MIDI 控制器

YoYo Yu

26 October 2026

Chip Trigger is a custom-built controller for shaping electronic music through pressure, hand movement, buttons and knobs. It connects to Ableton Live through Arduino and a custom Max for Live device.

PHYSICAL COMPUTING / MUSIC INTERACTION



The assembled controller. Frosted acrylic, four arcade buttons, four knobs, FSR and distance sensor.

Why I made it

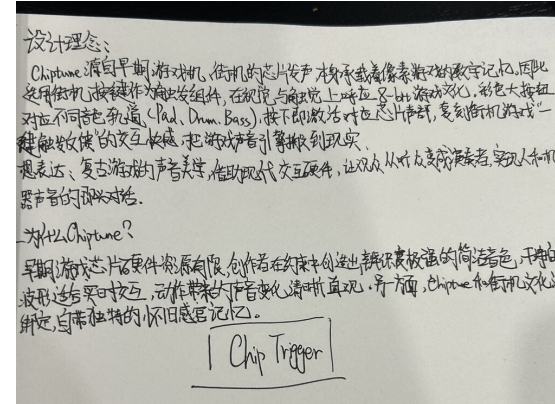
My experience playing the violin made me interested in how small physical changes can affect a sound. While exploring MIDI controllers, I wondered how I could bring more of that control into electronic music.

Learning about the theremin introduced me to playing through movement in space. I used an ultrasonic sensor to read hand distance and an FSR to connect pressure with changes in timbre.

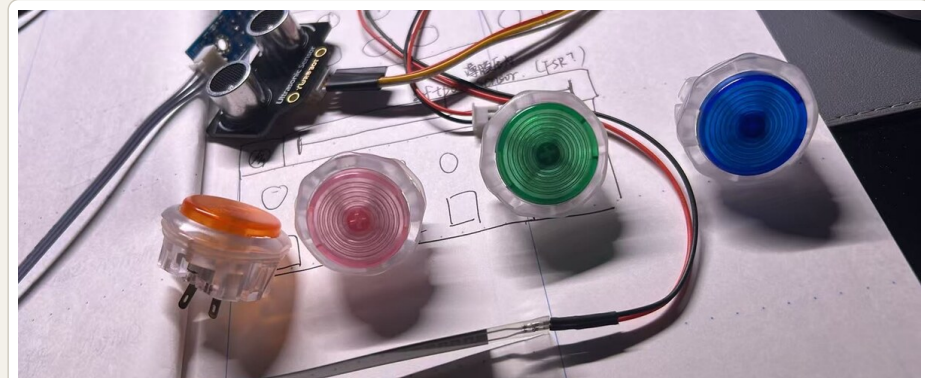
I was born in 2009, so the sounds and colourful buttons of older games were a new discovery for me rather than a childhood memory. Chip Trigger brings these interests together in a controller I could build and perform with.

The violin and the theremin are starting points for the interaction, not emulations of either instrument.

*Small physical changes
can change a sound.*



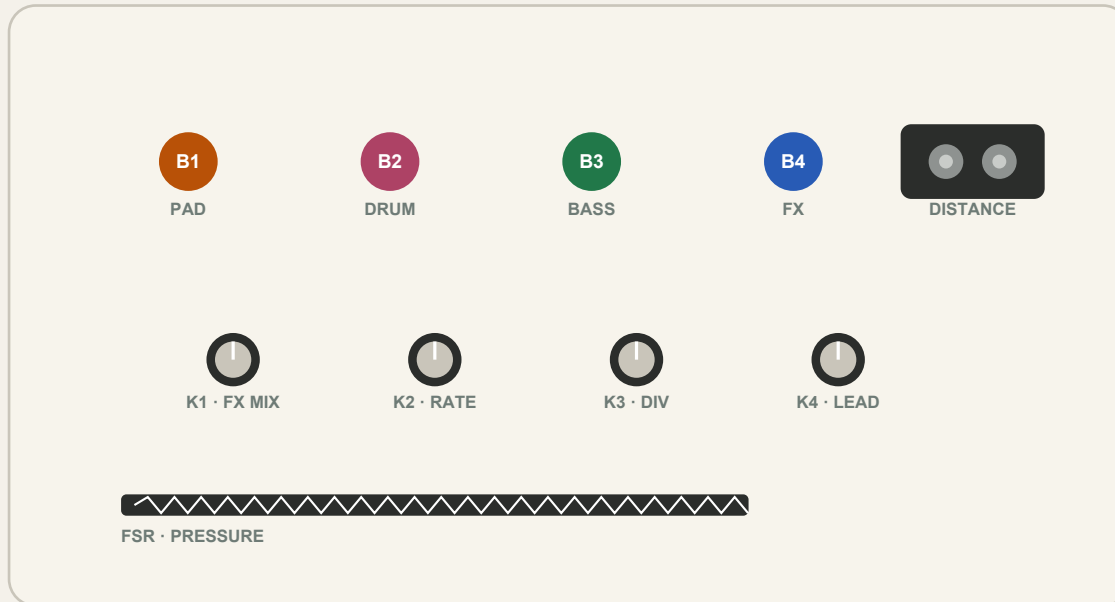
Concept notes, October 2026: arcade-inspired buttons trigger chiptune layers, with colour distinguishing Pad, Drum and Bass.



Layout study: arcade buttons and an ultrasonic sensor arranged on a hand-drawn plan.

How I play it

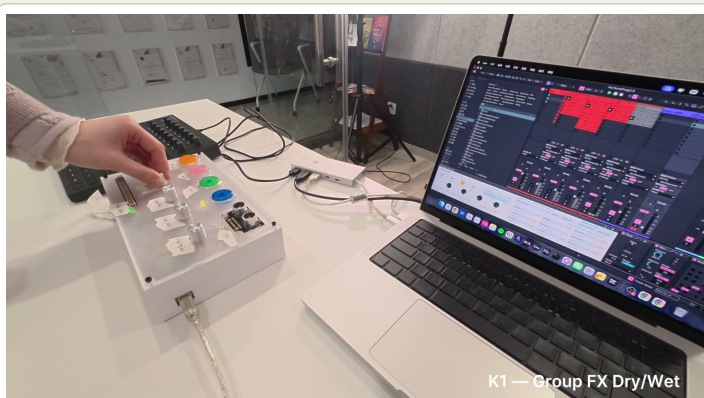
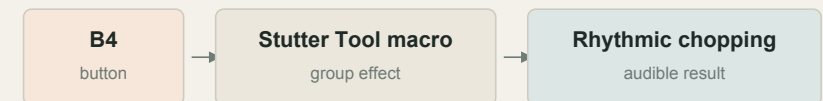
PANEL LAYOUT



CONTROL GROUPS

- B1-B3** Add or remove Pad, Drum and Bass.
- B4** Stutter Tool macro: rhythmic chopping and reordering.
- K1** Group effect blend.
- K2** Sample rate and left delay time.
- K3** Arpeggiator division.
- K4** Lead delay blend.
- FSR** A single pressure-sensitive strip (FSR) feeds two tracks: Serum timbre, and Borg/Delay parameters on the A Model D Ford track. The unused track is turned down in the mixer.
- DIST** Hand distance selects notes from a seven-note major scale; Live's Scale device narrows them to major pentatonic.
- LCXL** Novation Launch Control XL, an external mixer controller for levels and mutes.

ONE ACTION TO SOUND



Feature demonstration - 02:10.

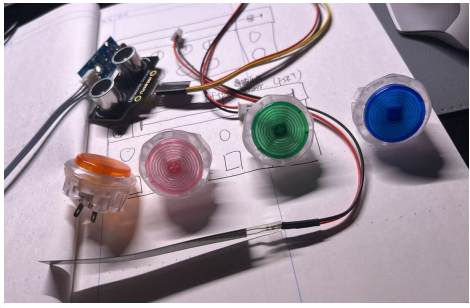
From prototype to build

Selected moments from layout experiments, prototyping and assembly.

BUILD ROLES

Outer form and control layout by YoYo Yu, who also took part in prototyping, soldering, wiring, assembly and testing.

Zøe Qiang provided technical guidance and practical assistance, including Fusion modelling, PCB shield layout, soldering support, printing and acrylic panel sourcing.



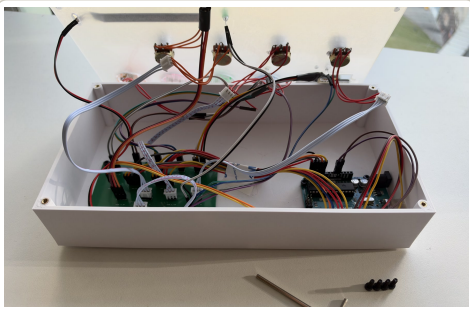
01 / LAYOUT

Arcade buttons and an ultrasonic sensor on a hand-drawn plan.



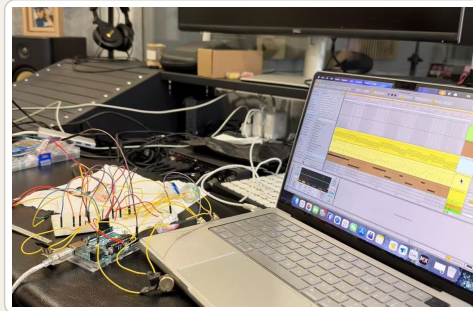
02 / PROTOTYPE

YoYo wiring the breadboard with buttons, knobs and sensor leads.



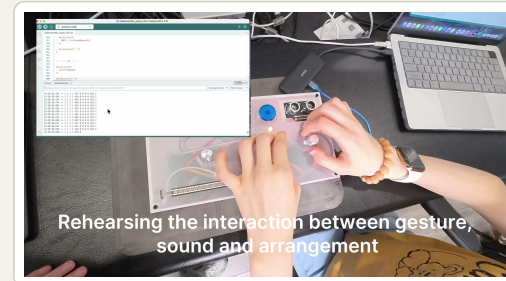
03 / ASSEMBLY

Open shell: panel pots, carrier board and colour-coded wiring.



04 / CONNECTION

Breadboard prototype connected to Ableton Live during signal-path setup.



Behind the Build - 01:02.

Form and construction

The white PLA enclosure holds the panel, carrier board and wiring. A 3 mm frosted acrylic panel reveals the electronics beneath it. Heat-set M3 inserts secure the assembly.

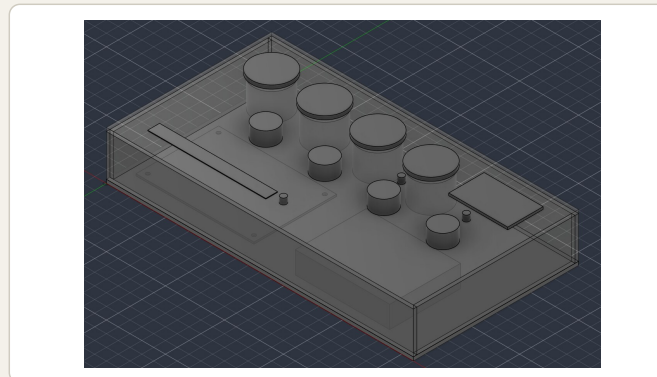
The white enclosure was selected for the build; the black version remained a colour study.



RENDER / NOT SELECTED

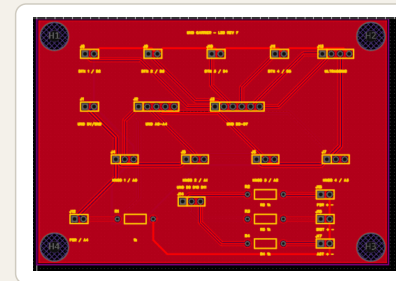


RENDER / SELECTED

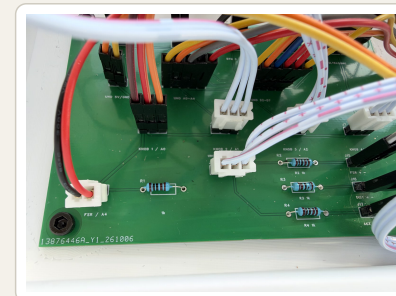


FUSION / REVA_DRAFT

Layout study of how the panel, knobs and carrier sit in the shell. Not the final printed model.



PCB / REVF



ASSEMBLED BOARD

The same carrier board in the build.

From gesture to sound

PHYSICAL INPUT

Buttons + knobs

B1-B4
K1-K4
Pad / Drum / Bass / FX

FSR

pressure
two routes

Ultrasonic

distance in cm

MICROCONTROLLER

Arduino Uno

read controls
read pressure
read distance
send USB serial

SOFTWARE

Max for Live

Gesture Path V9
parse + smooth
bind LOM paths
distance -> 7-note major

ABLETON LIVE

Live parameters

track switches
effect blends + timing
Serum brightness + Borg / Delay

MIDI notes

7-note major
Scale -> major pentatonic

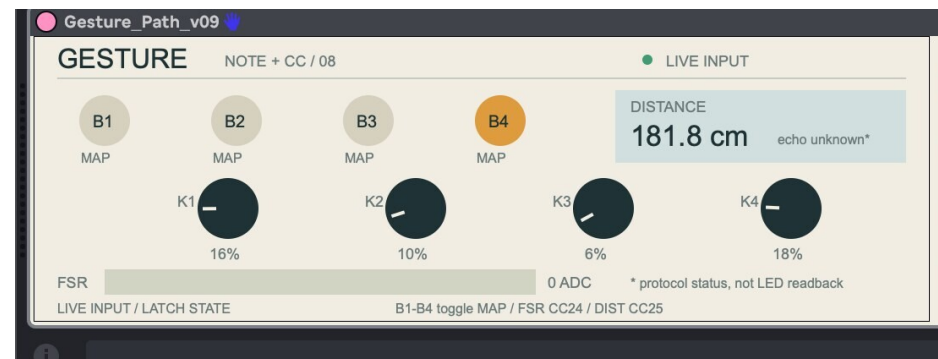
Instruments + mixer

PerformProg2.0
Live mixer
audio out

Launch Control XL (external): mixer levels and mutes.

The Arduino sends serial data over USB, not class-compliant MIDI. Max for Live converts the data into parameter changes and MIDI notes.

I used pasted Live Object Model paths to bind controls to chosen parameters across tracks. Reopening the device still requires rebinding the controls.



Gesture Path V9, the custom control layer (detail).

Performing the arrangement



One continuous performance, filmed with multiple cameras and an OBS screen capture. The controller shapes a prepared Ableton Live Set with manually configured mappings.

The six-part form was planned on paper and performed using the controller.

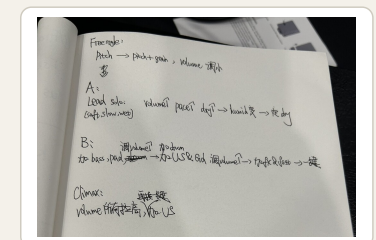
In section B, I bring in Bass and Pad, raise their track levels, then add Drum. I raise the levels of the FSR- and distance-controlled tracks for gestural playing, adjust K1 and K2, and press B4 to engage Stutter.

Performance film - 04:41. One continuous performance, six movements.

MOVEMENT MAP

Freestyle 00:00-00:49	A 00:49-01:41	B 01:41-02:38	Climax 02:38-03:32	A' 03:32-04:01	C 04:01-04:41
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Handwritten cue sheet used to plan the six-part performance.

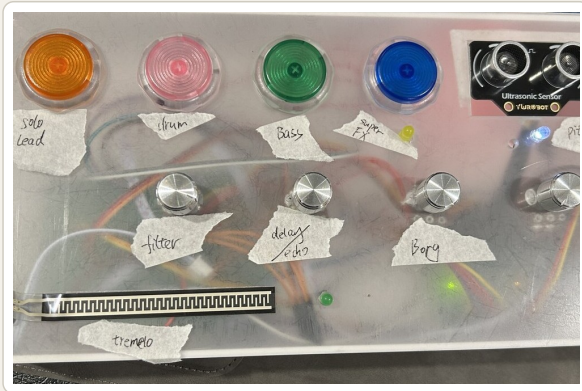


Cue sheet (detail).

What I learned

Sensor readings sometimes drift, so the same gesture does not always produce the same musical result. Improving that stability is the next priority.

Reopening the device also means rebinding the controls. Adding mapping recall is my second priority.



Early labelling experiment on the panel; the final mapping is B1 Pad, B2 Drum, B3 Bass, B4 FX.

CREDITS

Concept, interaction design, music and performance

YoYo Yu

I developed the concept, interaction design, music and performance, and took part in prototyping, soldering, wiring, assembly and testing, with technical guidance and practical assistance from Zøe Qiang.

Support — Zøe Qiang:

Fusion modelling, PCB shield layout, soldering support, enclosure printing, acrylic panel sourcing and programming guidance.

AI / TOOLS

AI coding agents assisted with debugging and implementing the portfolio website. No generative music tools were used to create the music.

THIRD-PARTY SOURCES

Ableton Live 12 Suite and Core Library; Chop and Swing; Sequencers; Max for Live Essentials; Xfer Records Serum 2; Sonic Academy ANA 2. Stutter Tool is a Max for Live effect.