**Project conclusion & user manual**

Looking at this project beeing an audio exercise, we have learned a lot from this beautiful gadget. The project idea was aimed big, looking at the time available. We could get the audio part working, which became overwhelming, meaning that the focus switched a bit. The distance sensor became a musical instrument, featured with a four state cube compained by a joystick and some buttons and switches for settings filled up with jazz inside, while the MIDI part and capacitive sensing are not handled for now.

1 Joystick:

Switch toggle settings mode

Up / Down mode 1: root note oscillator 1 | mode 2: offset oscillator 2

Right: cycle waveshapes osc 1

2 LED Switches

Oscilllator 1 and 2 can be switched on and off. The current state is indicated by a white LED.

3 Buttons

hdgfc

4 state cube

Detects four orientations of a cube by using two \_\_\_\_\_ sensor modules. This helped us a lot for testing new functions since we always had two or three test modes available without touching working routines. The cube can be used musically as a note off command by turning to mode \_\_\_\_\_\_\_\_\_ or turning the device into a speaker tester by letting it run a frequency sweep in mode \_\_\_\_\_\_\_\_\_. The jazz theremin can be found on mode 1. The modes are indicated as binary on the two module LEDs.

1: theremin plays many jazz scales

2:

3:

4:

ESP32 connector

since we wanted to try out the idea of connecting to different µCs we skipped the MIDI part as fast UART responder and aimed for a ESP32 connection for handling the display and possible further inputs via ESPNOW and webserver control. Combing stable, lossless MIDI and other fast UART connections while reading a interrupt based distance sensor seems hard on the CPU and is not achieved yet.

**Part Info & Datasheets**

# HC-SR04 Ultrasonic Distance Sensor

<https://cdn.sparkfun.com/datasheets/Sensors/Proximity/HCSR04.pdf>

# 1.3 inch OLED I2C 128 x 64 Pixel Display

<https://cdn.shopify.com/s/files/1/1509/1638/files/1_3_Zoll_Display_Datenblatt_AZ-Delivery_Vertriebs_GmbH_rev.pdf?v=1606164520>

# Steel Push Buttons 0.63 inch flat LED Ring White

<https://www.led-taster.de/mediafiles/Sonstiges/Datenblatt/16/P16-RF-X.pdf>

**B3F-1 Tactile Button Switches**

<https://cdn-shop.adafruit.com/datasheets/B3F-1000-Omron.pdf>

# KY-023 Dual Axis Joystick Module

<https://arduinomodules.info/ky-023-joystick-dual-axis-module/>

# 8 Ohm Speaker

<https://components101.com/sites/default/files/component_datasheet/8%20ohm%20speaker.pdf>

**KY-027 Magic Light Cup Module**

<https://arduinomodules.info/ky-027-magic-light-cup-module/>

**TXB0108 Bidirectional Voltage Shifter**

<https://www.adafruit.com/product/395#technical-details>

<https://cdn-shop.adafruit.com/datasheets/txb0108.pdf>