

# SonoRo Build Guide

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## Section 1 – Sound Card Connections

### Required Components

- Multichannel sound card
- Five Adafruit I2S MEMS microphones
- Custom microphone connection board
- MAX98357A I2S Class-D mono amplifier
- Two 12-pin dual-row connectors (with red/black wires)
- One 5-pin connector wire

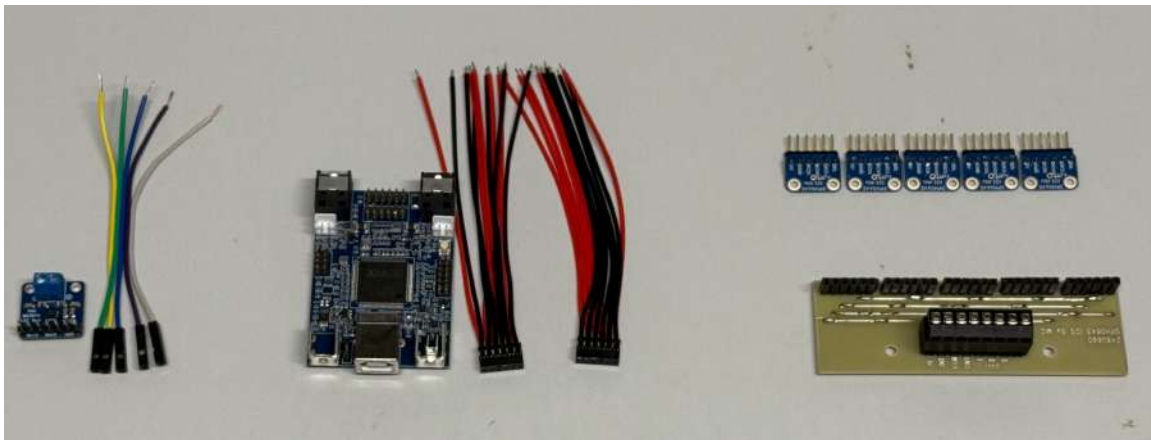


Figure 1: Required components for section 1

### Step 1: Connect 12-pin Connectors

Attach both 12-pin dual-row connectors to the multichannel sound card. Refer to Figure A. Insulate unused wires and set aside. (See Figure 2 and Figure 4)

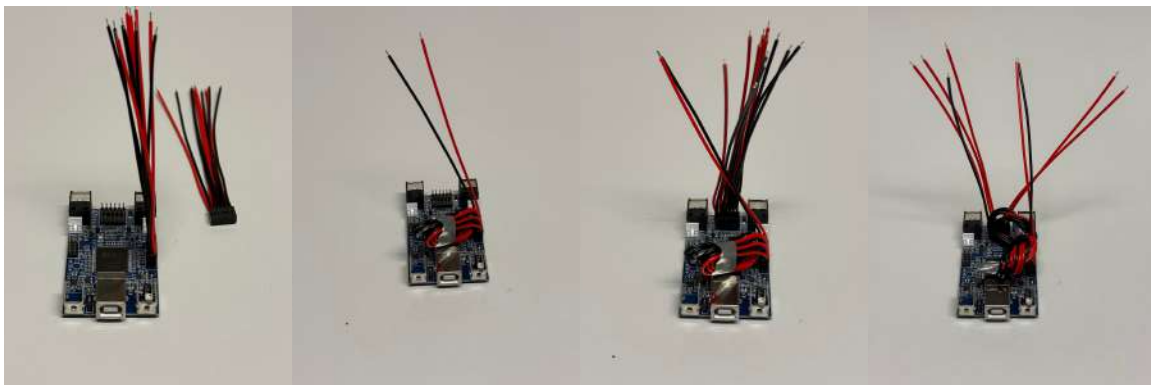


Figure 2: Connect 12-pin Connectors

## Step 2: Connect 5-pin Connector

Attach the 5-pin connector to the I2S amplifier following Figure A. (See Figure 3 and Figure 4)



Figure 3: Connect 5-pin Connector

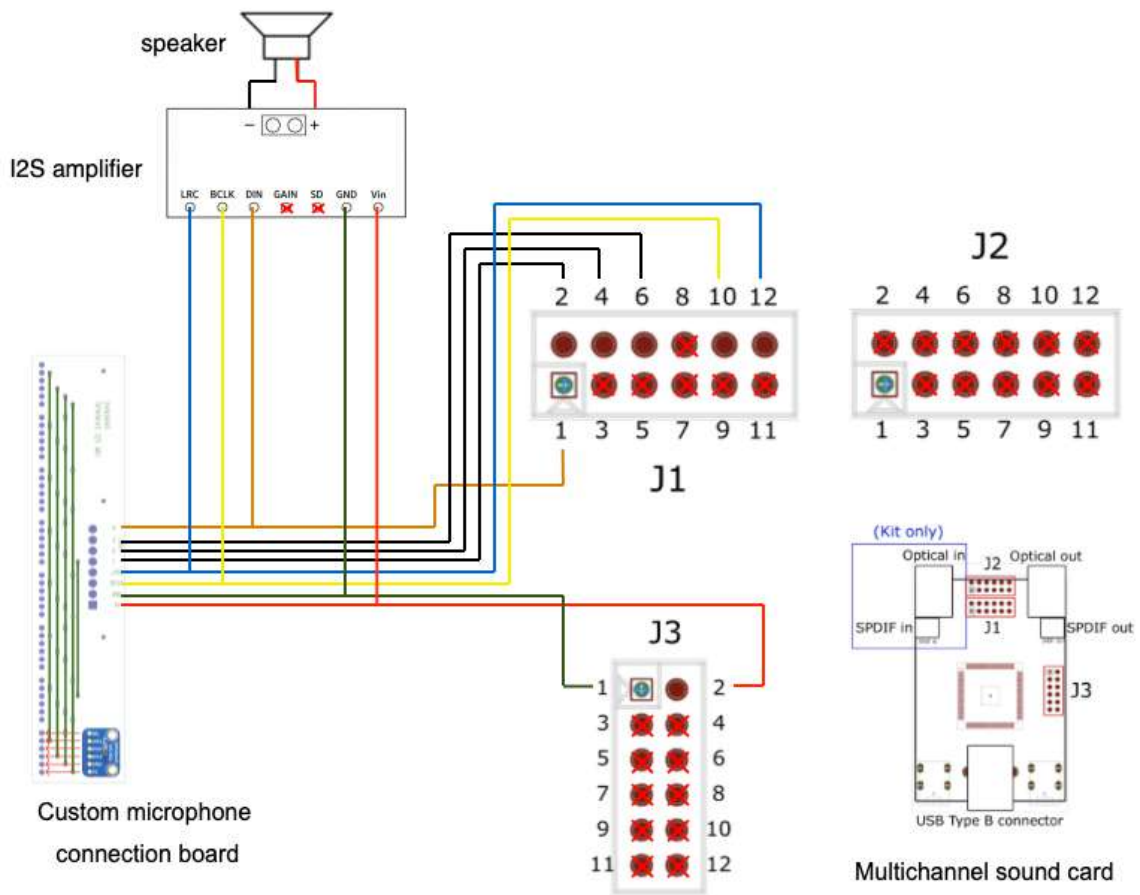


Figure 4: Full Sound Card circuit

### Step 3: Wire Amplifier to Sound Card

Label	Connection (See Figure 4 and Figure 5)
A	I2S amplifier GND → J3 pin 1 (GND)
B	I2S amplifier 3V → J3 pin 2 (3.3V)
C	I2S amplifier LRC → J1 pin 12 (LRCLK)
D	I2S amplifier BCLK → J1 pin 10 (BCKL)
E	I2S amplifier DIN → J1 pin 1 (I2S data OUT Ch 1&2)

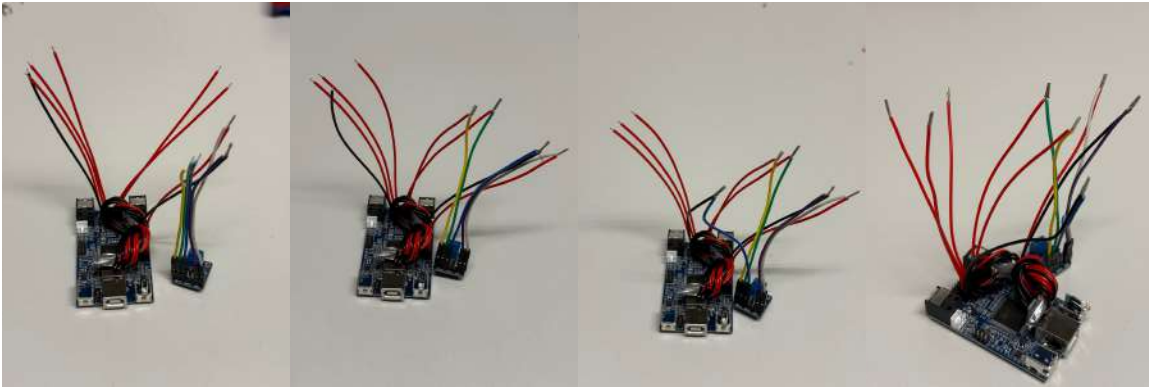


Figure 5: Wire Amplifier to Sound Card

### Step 4 – Connect Custom Microphone Board

Label	Connection (See Figure 4 and Figure 6)
A	GND → Custom board GND
B	3.3V → Custom board 3V
C	LRC → Custom board LRC
D	BCLK → Custom board BCL
E	DIN → Custom board DOUT 4
—	J1 pin 2 → DOUT 1
—	J1 pin 4 → DOUT 2
—	J1 pin 6 → DOUT 3

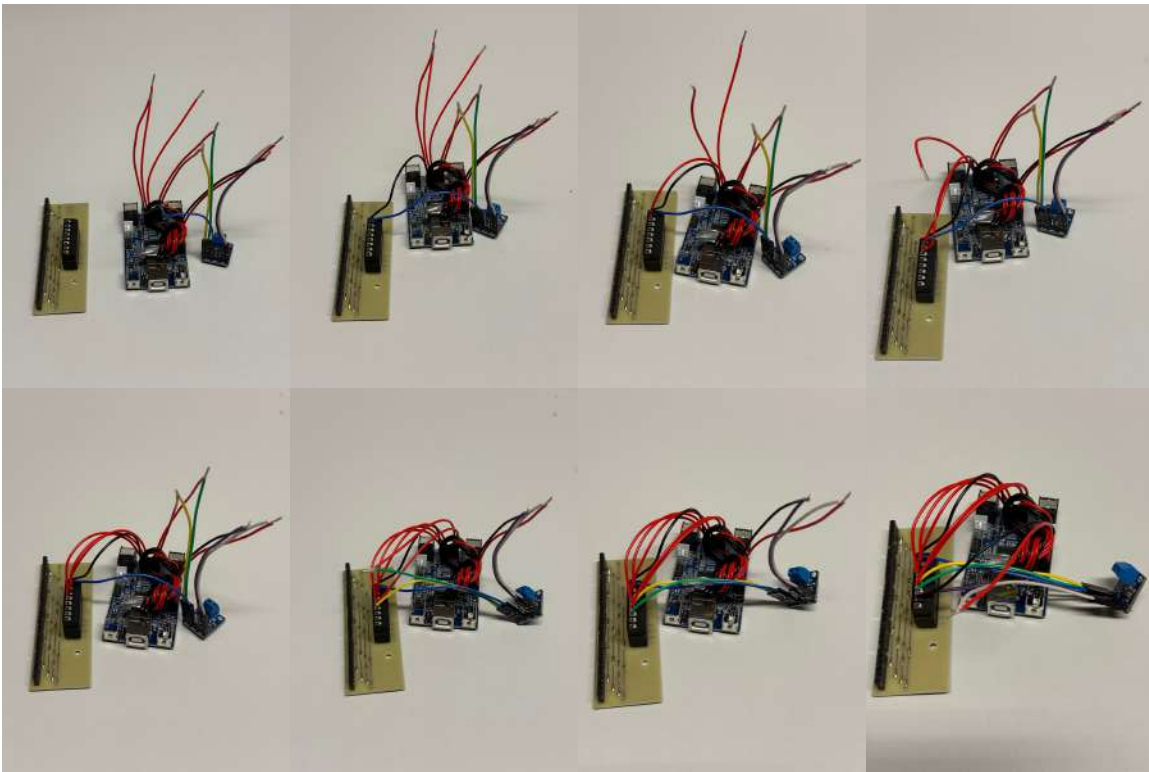


Figure 6: Connect Custom Microphone Board

### Step 5 – Attach Microphones

Insert each microphone into the custom board slots. (See Figure 7)

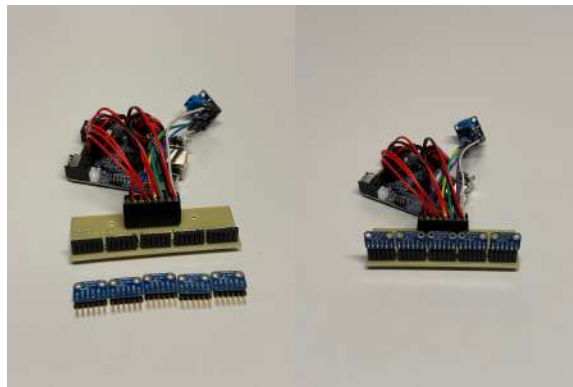


Figure 7: Attach Microphones

## Section 2 – Speaker Connection

### Required Components

- Assembly from Section 1
- Speaker
- Two wires (red and black)

## Step 1 – Connect Speaker

Connect positive to positive and negative to negative between I2S amplifier and speaker. (See Figure 8)

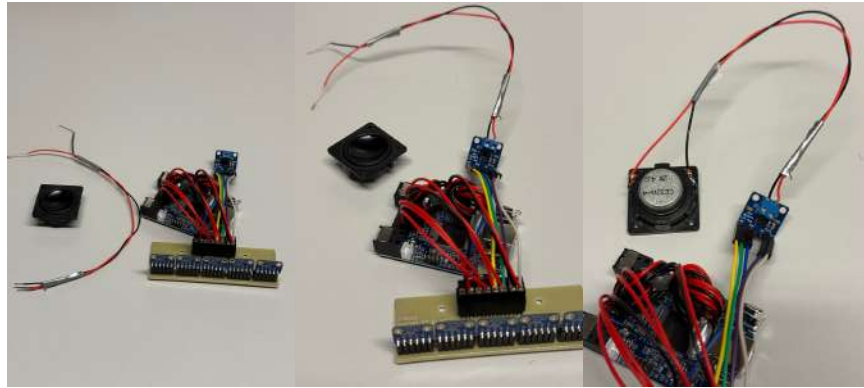


Figure 8: Connect Speaker

## Section 3 – Final Assembly

### Required Components

- Assembly from Section 2
- 3D printed cases (A, B, C)
- Sound card case (D)
- Thymio II
- Power bank
- Raspberry Pi
- Power cable
- Sound card ↔ Raspberry Pi cable
- Thymio ↔ Raspberry Pi cable



Figure 9: Required components for section 3

## Step 1 – Install Speaker in Case A

Detach speaker, place into Case A slot, reconnect wires. (See Figure 10)

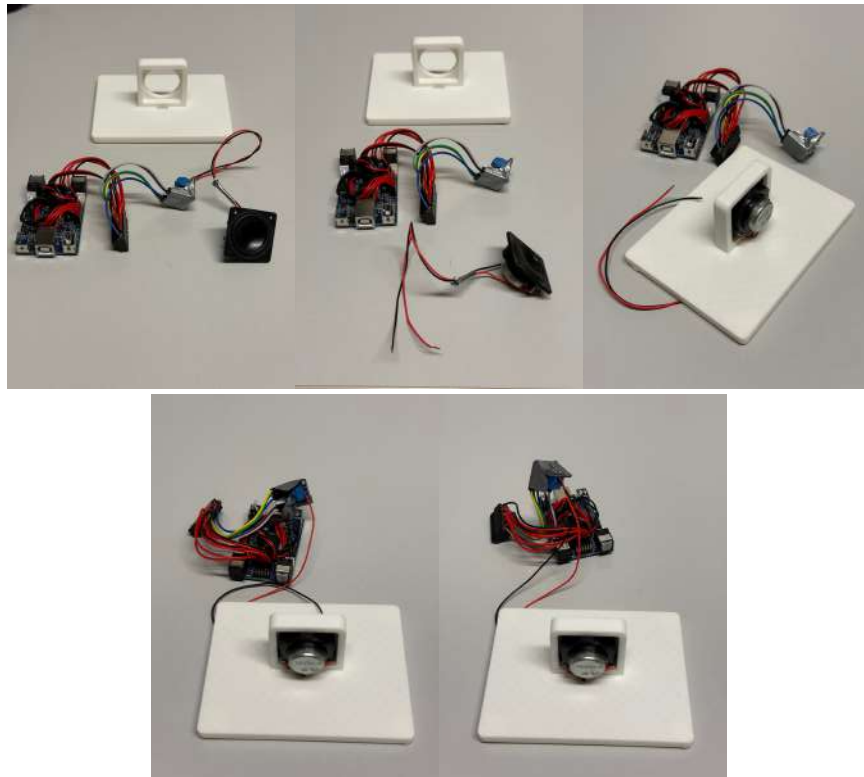


Figure 10: Install Speaker in Case A

## Step 2 – Prepare Case B

Attach microphones and mount Raspberry Pi with cable. (See Figure 11)

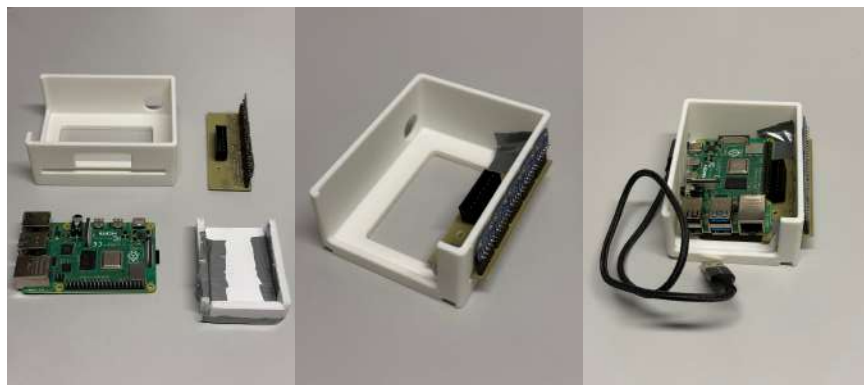


Figure 11: Prepare case B

### Step 3 – Install Sound Card

Place sound card (Case D) into Case B above Raspberry Pi. (See Figure 12)

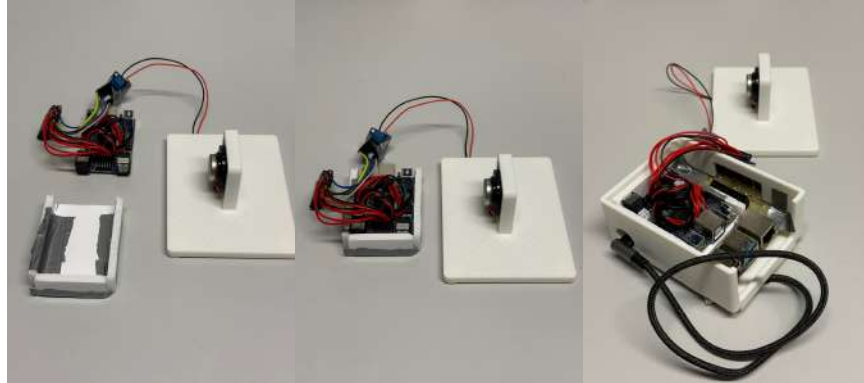


Figure 13: Install sound card

### Step 4 – Internal Connections and Closure

Connect microphone board, place amplifier inside Case B, close with Case A. (See Figure 12)

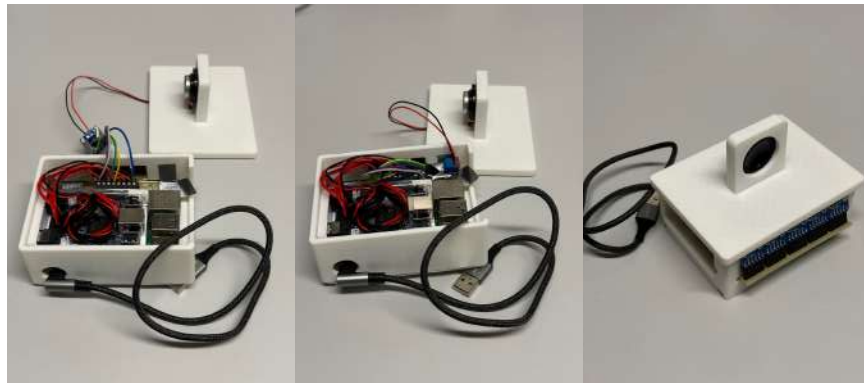


Figure 12: Internal Connections and Closure

### Step 5 – Final Integration

Place power bank and cables in Case C, mount assembly, connect all cables, and place on Thymio II. (See Figure 13)



Figure 13: Final integration

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