

ARS-50 : Sodiac EVA-BOARD for PiezoListen User's Manual

Version 1.0 - October 23, 2025
AREX Inc.

This product is an evaluation board designed for use with TDK's PiezoListen piezo speaker (hereafter referred to as "PiezoListen").

By connecting the evaluation board to a mobile device such as a smartphone via Bluetooth, and attaching PiezoListen to various surfaces, users can play music or voice audio and apply frequency correction using the equalizer function to evaluate the sound quality and volume characteristics of PiezoListen.

1. Package Contents

1	Evaluation board unit (assembled from three individual PCBs) × 1
2	Power cable (USB Type-A ↔ USB Micro-B) × 1
3	PiezoListen connection cable (1 meter) × 1
4	Adhesive tapes for PiezoListen mounting — 4 types, 5 pieces each: PHUA2010 (20mm × 10mm) PHUA3015 (30mm × 15mm) PHUA3030 (30mm × 30mm) PHUA6630 (66mm × 30mm)

2. Specifications

Model Number	ARS-50
Power Supply	DC 5V (via USB Micro-B)
CPU	Renesas RA6M4
Bluetooth Module	Feasycom FSC-BT631D
Amplifier	Texas Instruments TPA3116 (Class D) Gain setting: +32 dB
Sampling Frequency	44.1kHz
Playback Format	Mono, 16-bit PCM
Equalizer	7-band frequency adjustment (center: 172, 344, 602, 1.4k, 3.2k, 6.2k, 15k [Hz]) Gain levels per band: +1, 0, -2, -4, -6, -10, -12, -16, -18, -20 [dB] (10 steps total)
Low Pass Filter (LPF)	3rd-order PWM smoothing filter (microcontroller output side) 2nd-order PWM smoothing and EMI suppression filter (amplifier output side) implemented with discrete components
Amplifier Input Voltage Selector Switch	Switchable between 24 Vp-p and 48 Vp-p depending on PiezoListen size
Board Dimensions	91 mm (W) × 55 mm (H)

3. Board Layout

The PiezoListen evaluation board consists of a stacked configuration of three circuit boards, as shown in Figure1.

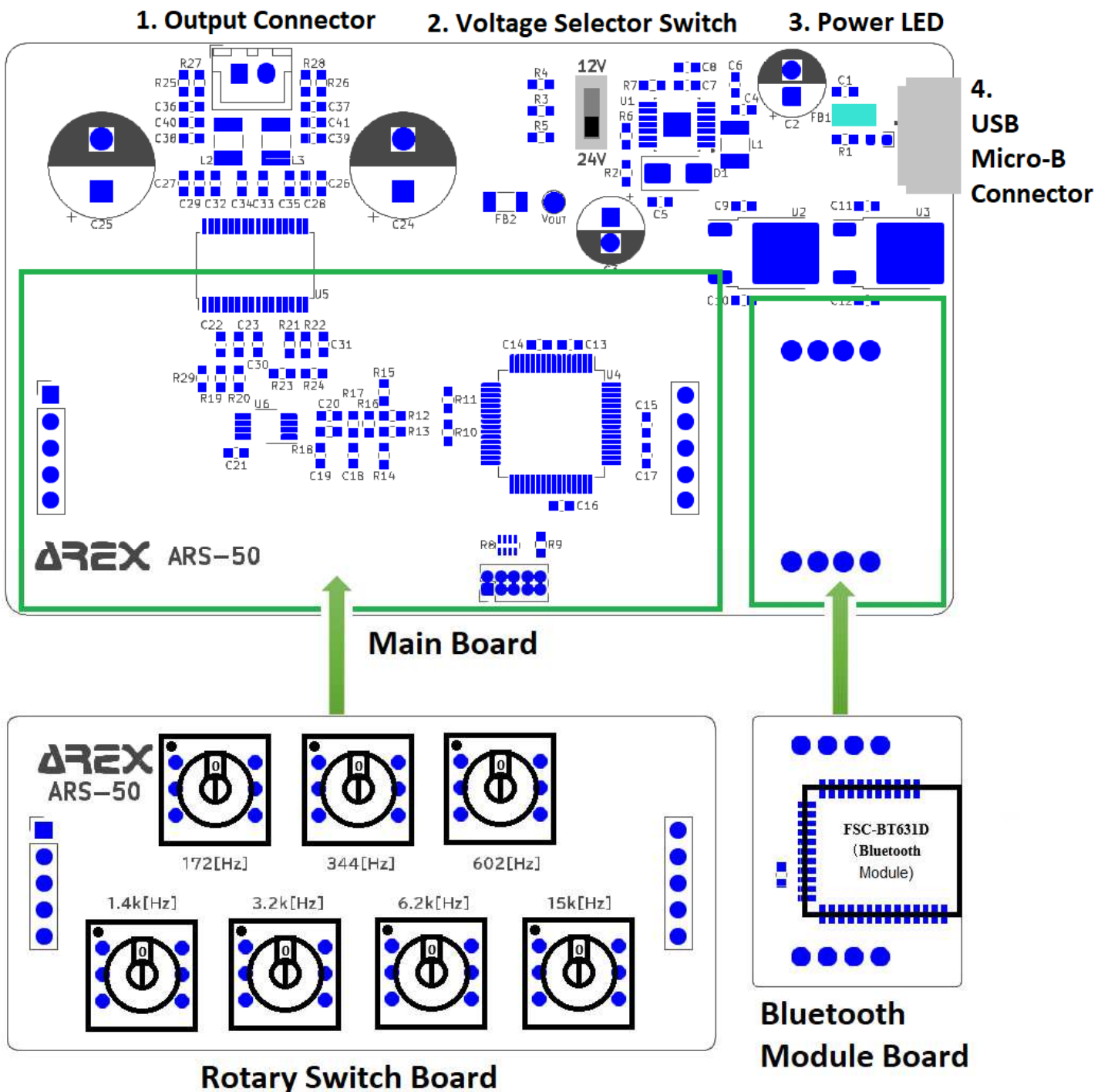


Figure1. PiezoListen evaluation board

4. Usage Instructions

4.1 Preparation

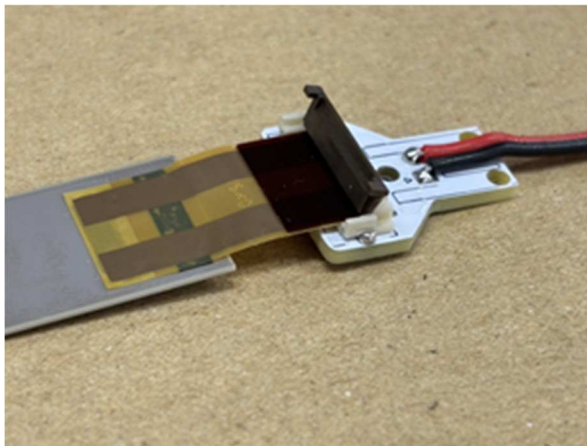
4.1.1 PiezoListen Setup

- 1) Use the dedicated adhesive tape to attach PiezoListen to the target surface.
- 2) Refer to the diagram below to connect the PiezoListen film terminals to the PiezoListen connection cable:

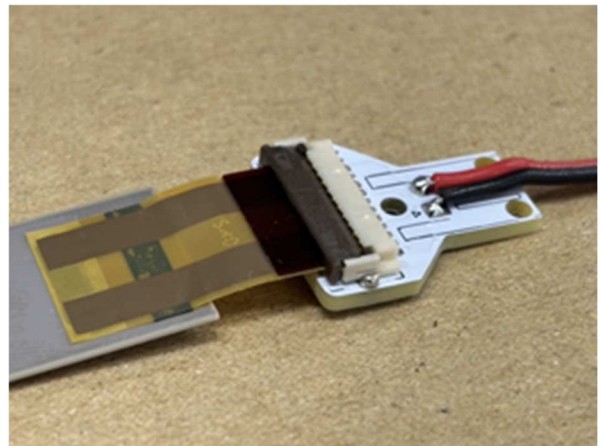
(a) Connection Cable: Terminal for PiezoListen (b) Lift the latch on the film terminal connector.



(c) Insert the film terminal until it stops.



(d) Lower the latch to secure the film terminal in place.



- 3) Connect the opposite end of the PiezoListen connection cable (from the diagram above) to the output connector located at the top left of the evaluation board (see Figure 1-1 on the previous page).

Caution

PiezoListen may be damaged due to bending during attachment or removal from the target surface.

For proper mounting and removal procedures, please refer to the following video by tesa:

<https://www.youtube.com/watch?v=TiDMyMYuUoc>

4.1.2 Evaluation Board Setup

- 1) Connect the USB Micro-B end of the power cable to the USB Micro-B connector located at the top right of the evaluation board (Figure 1–4), and plug the USB Type-A end into a PC or other power source.
- 2) Confirm that the power LED (Figure 1–3) is lit.
- 3) The amplifier input voltage must be adjusted according to the size of the PiezoListen speaker.
Use the voltage selector slide switch at the top of the evaluation board (Figure 1–2) to set the appropriate voltage:

PHUA2010:	12V (24Vp-p)	PHUA3015:	12V (24Vp-p)
PHUA3030:	12V (24Vp-p)	PHUA6630:	24V (48Vp-p)

4.1.3 Audio Playback Device (e.g., Smartphone)

- 1) Open the Bluetooth settings on your device and select the Bluetooth module's device name to pair.
- 2) The Bluetooth module will appear as "AREX-xxxx" (where xxxx is a 4-digit hexadecimal ID).
Launch a music playback app on your device and begin playback.
- 3) Confirm that audio is being output from the PiezoListen speaker.

4.2 Playback Procedure

- 1) Launch the audio playback app on your device and begin playback.
- 2) Adjust the playback volume using your device's volume controls.

4.3 Equalization

Use the seven rotary switches on the evaluation board to adjust the frequency characteristics (equalization).

The relationship between the dial number and gain level is shown below:

Dial Number	0	1	2	3	4	5	6	7	8	9
Gain [dB]	+1	0	-2	-4	-6	-10	-12	-16	-18	-20

Table 1. Gain Levels by Rotary Switch Setting

The frequency labels printed on the PCB adjacent to each rotary switch indicate the center frequency of the corresponding frequency band:

(172Hz、344Hz、602Hz、1.4kHz、3.2kHz、6.2kHz、15kHz)

5. Firmware Updates

If new features are added to the ARS-50 in the future, firmware update files will be provided.

Updating the firmware requires a Renesas debugger.

For detailed instructions on how to perform the update, please refer to the manual included with the firmware update files.

6. Support

1) If you have any questions regarding usage, please contact:

sodiac@arexinc.co.jp

2) If you run out of adhesive tapes for PiezoListen mounting, please contact:

trade@chip1stop.com

Table 2. Revision history

Revision number	Date	Revised content
1.0	October 23th, 2025	Create the first edition. (English translation version)