1. Overview

Figure 1: Soundskrit DoA Demo Kit

The DoA (Direction of Arrival) Demo Kit is designed to demonstrate Soundskrit's sound-localization performance. The kit includes a DoA board—a PCB populated with four cardioid microphones—together with an embedded camera board. The DoA board connects to the Soundskrit PARDI board, which interfaces the MEMS microphones to a PC over USB. The camera board connects directly to the PC over a separate USB cable.

You can evaluate its performance using the Soundskrit Demo Kit Interface software, which presents a visual display of the detected sound origin. Users can change the number of people that can be simultaneously detected and toggle Voice Activity Detection (VAD) on or off depending on if they which to localize all sounds or just speech only.

What's In the Box	
DoA Board	DoA board with four cardioid microphones, one at each corner of the board grid.
Camera Board	720p wide-angle camera with digital output.
Soundskrit PARDI audio interface	Multichannel audio interface that connects the microphones to a PC over USB.
Molex cable	Connects the DoA microphone board to the audio interface.
Camera cable	Carries the camera video signal to your PC.
USB-A to USB-C cable	Connects PARDI board to your PC.

Table of Contents

2. Hardware Introduction

2.1 DoA Board Introduction

The DoA board is a PCB carrying four SKR0610 microphones, each fitted with a special mesh that gives it a cardioid response. The microphones are arranged as a square array, one at each corner of the board grid, 47mm spacing to each other.

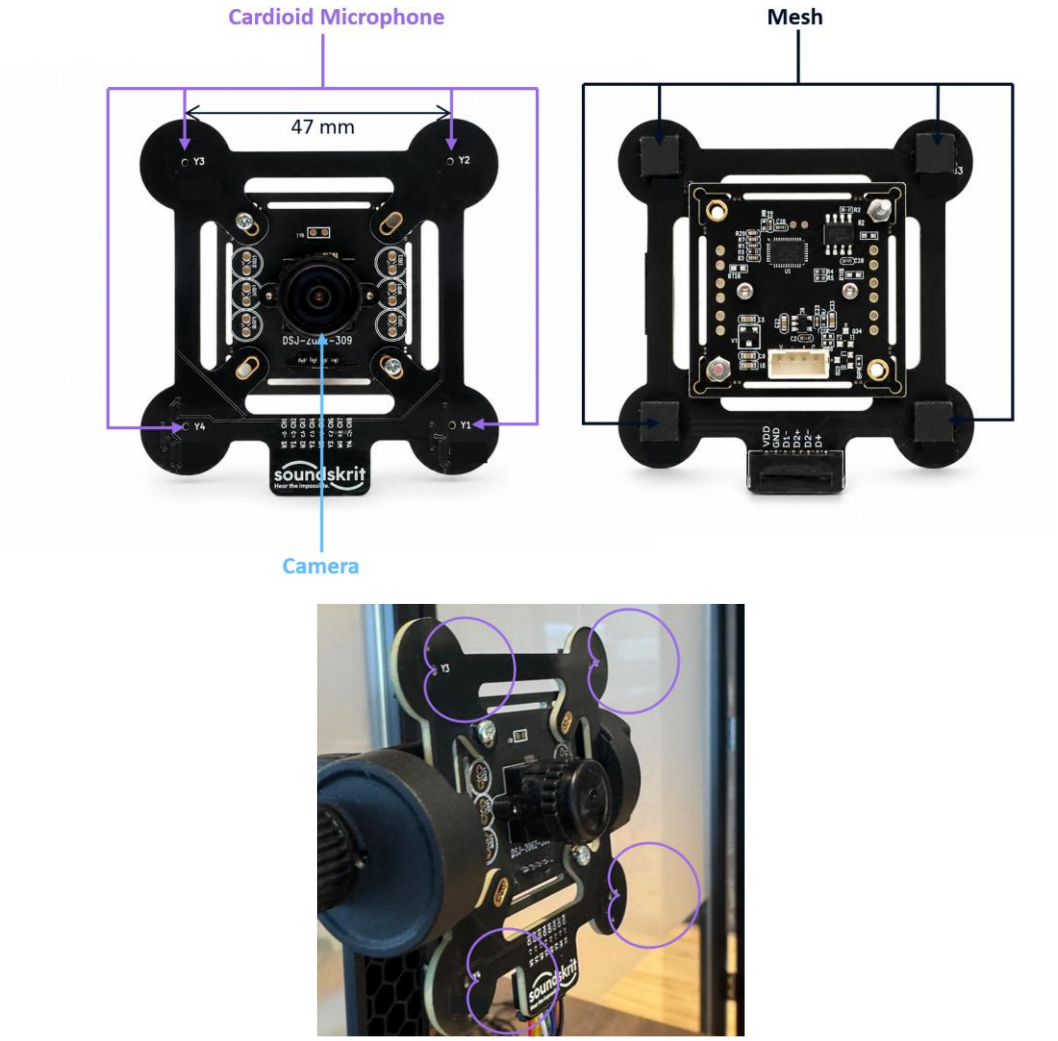


Figure 2: DoA Demo Kit Board and Microphones Configuration

2.2 PARDI Board Interface

The PARDI audio interface has a USB-C connector for the PC and a Molex connector for the DoA board. The Molex cable ships pre-connected and only needs to be reattached if it become disconnected.

Figure 3: PARDI Audio Interface Board

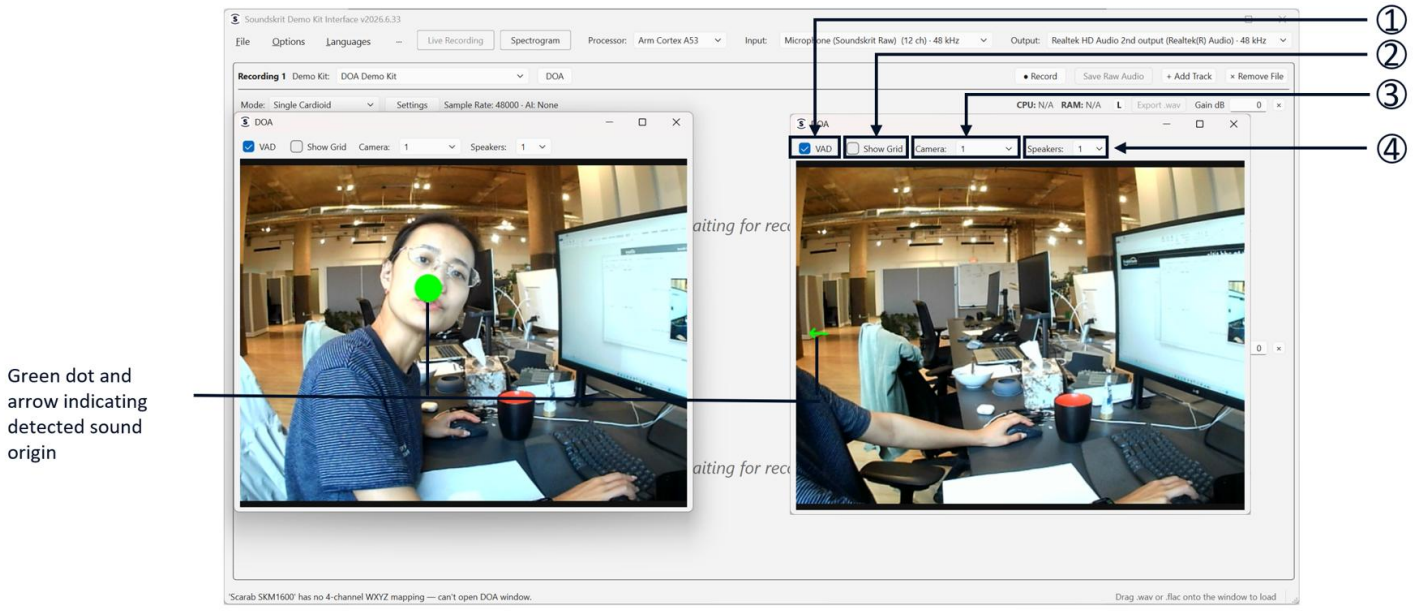
2.3 Camera Board

The camera used in the DoA demo kit is a 720p USB camera that offers a 140° wide-angle field of view and plug-and-play compatibility. It provides a visual reference on which the detected sound location is overlaid.

3. Software Introduction

To convey sound-localization performance clearly, Soundskrit developed an intuitive visualization interface, integrated into the **Soundskrit Demo Kit Interface**. For configuration details, refer to the Setup Guide in **Section 5.**

In the interface, a green dot marks the sound source detected by the DoA kit. If the source lies outside the camera's field of view, a green arrow appears instead, indicating the direction of the sound source. This lets you judge DoA accuracy at a glance and assess performance throughout testing.



1. **VAD On/Off** – Enable or disable Voice Activity Detection.
2. **Grid Display** – Show or hide the grid for accuracy testing.
3. **Camera Selection** – Automatically selected as the DoA camera
4. **Speaker Selection** – Select the number of speakers (1–3 options available).

Figure 4: DoA Interface and Corresponding Functionality

For more detailed introduction of Soundskrit Demo Kit Interface, please refer to Downloads → **Soundskrit Demo Kit Interface User Manual**.

4. Algorithms in DoA Demo Kit

The DoA kit runs a processing chain that converts the raw microphone signals into a DoA estimate, providing the coordinates of the sound source for applications such as voice tracking, beam steering, etc.

An AI-based Voice Activity Detection (VAD) algorithm is used to determine whether the kit responds only to speech, or to the loudest sound of any kind, non-speech sounds. You can enable or disable VAD from the interface window.

The DoA algorithm then detects the direction of the sound by leveraging the signals detected from the four cardioid microphones and outputs the coordinates of the sound source, which the interface displays as a green dot or arrow. You can set the speaker count from 1 to 3 to localize one or several simultaneous sources. When set to a single source, the kit reports the loudest speech source when VAD is enabled.

5. Setup Guide

5.1 Installation

Download and launch the Soundskrit Demo Kit Interface installer file from the Downloads page on Soundskrit's website and follow the installation steps. A prompt may appear requiring approval for an unknown publisher.

Connect the kit to your PC using the included USB-A cable and camera cable.

To start the software, search from the Windows start menu for 'Soundskrit Demo Kit Interface' or use the desktop shortcut generated by the installer.

Make sure the DoA kit is correctly connected to the PC and that the PARDI board is in **raw mode**. If the PARDI board is not in raw mode (this may apply to units shipped before June 2026), a window will appear, prompting you to change the PARDI board to raw mode.

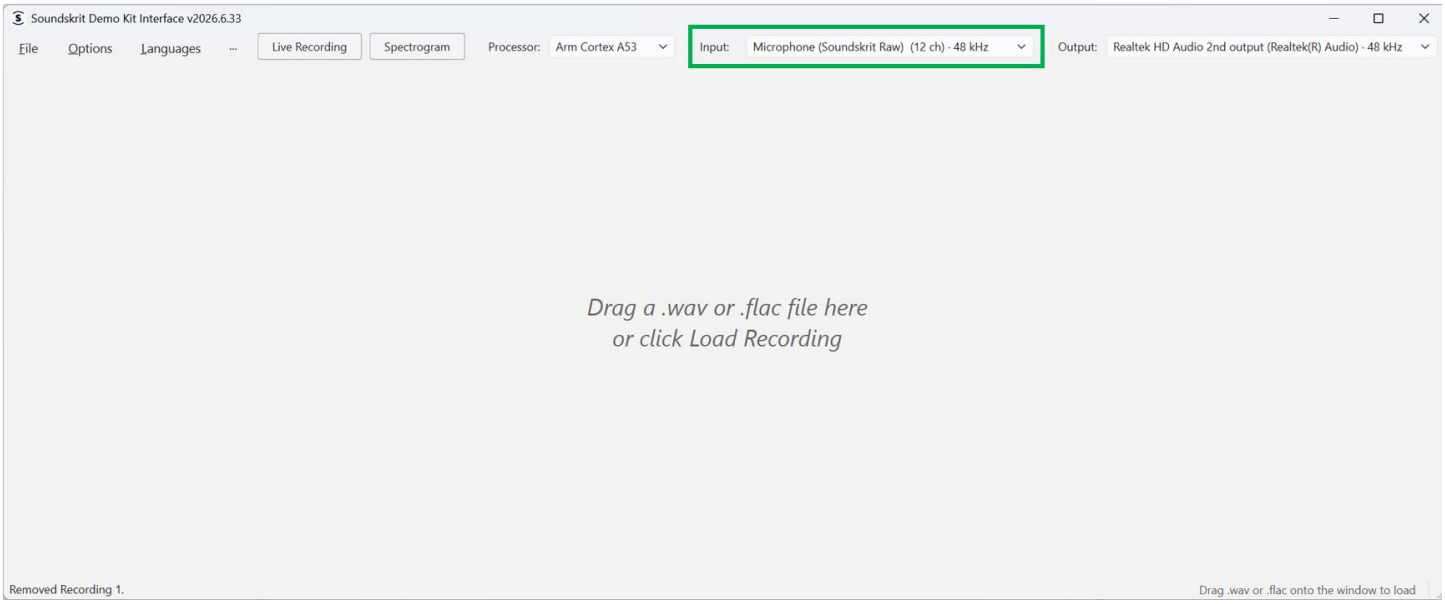


Figure 5: Raw Signal Detected in the GUI

5.2 DoA Performance Evaluation

Click **Live Recording** and select the **Demo Kit** as **DoA Demo Kit** from the drop-down menu. Then click the **DOA** button next to Demo Kit, and the DoA visualization interface will appear.

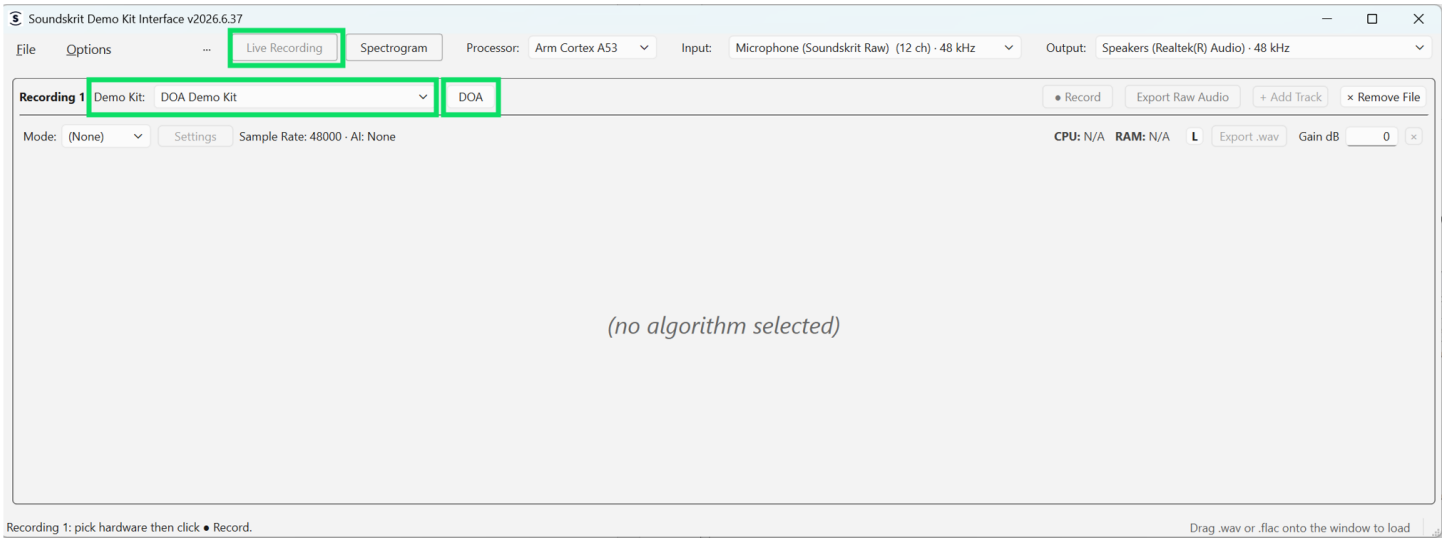


Figure 6: Open DoA Interface in the GUI

In the new window, you can begin testing the DoA performance. **Note:** If the DoA interface does not initialize correctly the first time it is opened, simply close and reopen the DoA interface.

Toggling **VAD** changes whether the DoA is triggered by speech or by the loudest sound. Toggling **Show Grid** overlays a reference grid on the camera view; each interval between two grid dots represents 5 degrees. Changing the number of **Speakers** from 1 to 3 enables the DoA kit to localize the sound source from 1 to 3 simultaneously.

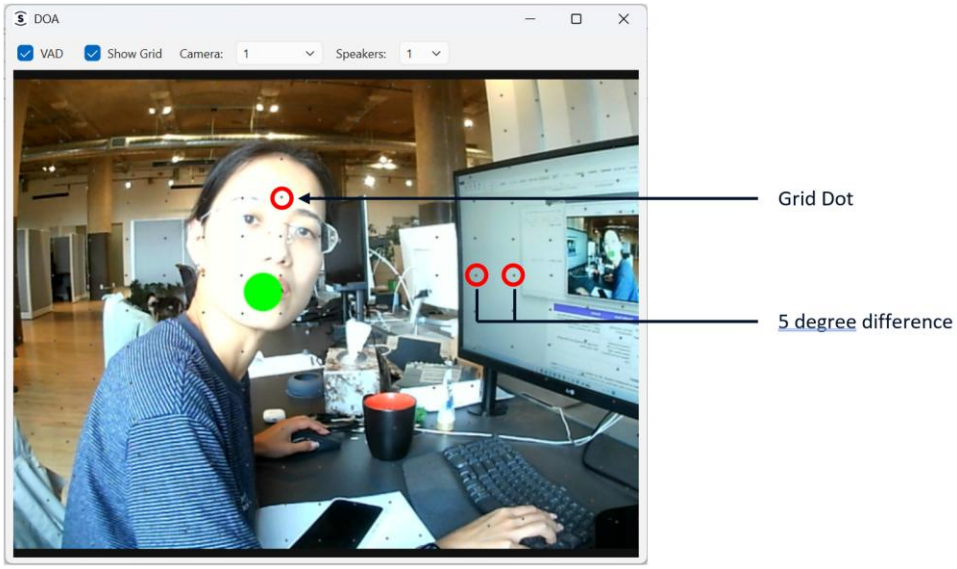


Figure 7: Grid Display in the DoA Kit Interface

6. Troubleshooting

This section provides solutions to common issues encountered during installation and operation of the demo kit.

Problem	Possible Cause	Solution
Soundskrit Demo Kit Interface doesn't show **Microphone (Soundskrit Raw)** in the **Input**	The DoA kit is not correctly connected to the PC.	Verify the connections between the PARDI board and the DoA board, and between the PARDI board and the PC. A green LED indicator on the PARDI board should flash when the connection is correct.
The view shown in the DoA interface is not the DoA kit's camera feed	The camera is not correctly connected to the PC, or the camera selected in the DoA interface is not the DoA kit's camera.	Recheck the connection and make sure the selected camera input is the DoA kit's camera, normally **Camera 1**.

7. Additional Support

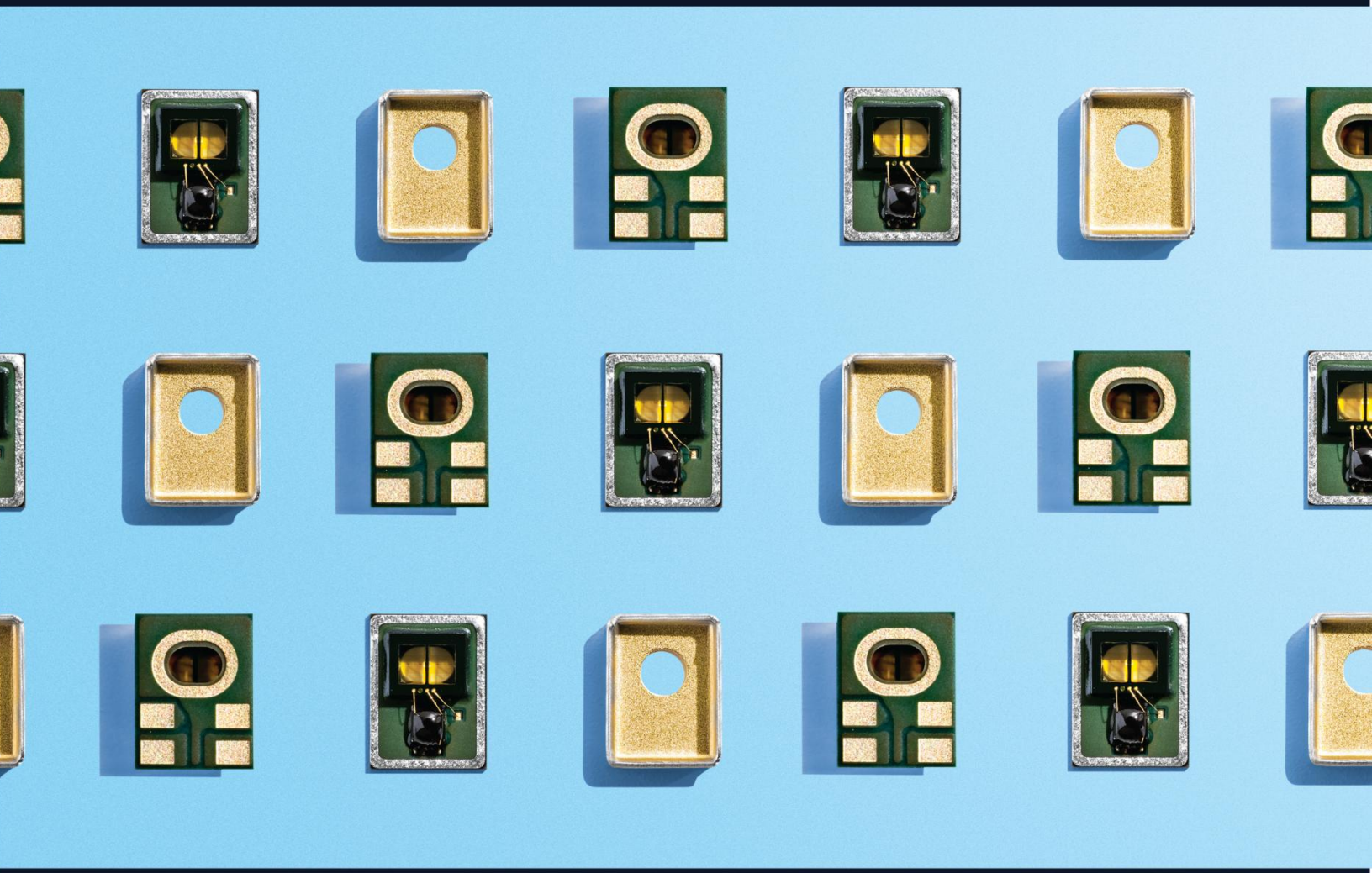
For further information on Soundskrit's products, visit our website at http://www.soundskrit.ca where you can find more application notes, datasheets, and purchasing information. If you have any questions or need technical support, please reach out to applications@soundskrit.ca.

8. Revision History

Revision Label	Revision Date	Sections Revised
-	Jun 2026	Initial release

Soundskrit developed the first high-performance directional MEMS microphone on the market, leveraging years of research in bio-inspired MEMS based on how spiders and other insects in nature hear. In combination with Soundskrit's in-house audio processing algorithms, directional microphones can be used to capture and isolate any sound in an environment with a fraction of the size, power, and computation of traditional omnidirectional-based microphone arrays.

Soundskrit was founded in 2019 and is headquartered in Montreal, Quebec with an R&D facility in Ann Arbor, Michigan.



soundskrit
Hear the impossible.