

Evaluation Kit for Distant Voice Acquisition



A robust, distant speech acquisition is a requirement for the use of voice control in the Smart Home, voice assistants or voice-controlled user interfaces of industrial plants and machines.

voice INTER connect offers vicDIVA (Distant Voice Acquisition Solution) especially for this use case - a solution for recording voice in room. This makes it possible to control devices several meters away by voice, even with simultaneous noise or several speakers.

The vicDIVA evaluation kit offers the possibility of configuring beamforming procedures individually and testing them for a specific application. vicDIVA consists of a customized microphone array with up to 8 microphones and status LEDs, the hardware module vicSBM for processing up to 8 microphone signals, and a host platform (Raspberry Pi 3) for application development, which supplies power to the vicSBM and provides the cleaned audio signal over an audio interface for your application. An example application on the Raspberry Pi allows the subjective evaluation of the output signal of the beamformer via connected headphones and the configuration of the beamforming algorithms on the vicSBM via the console. For evaluation purposes, the kit is provided with an elliptical 8-microphone array.

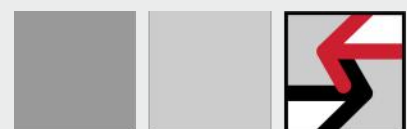
Product Features

- Development kit for evaluation of beamforming algorithms and individual microphone arrays
- Robust distant voice acquisition
- Suppression of room influences such as reverberation and noise
- Positioning and display of the speaker
- Tracking of speakers in the room

Applications

- Voice-controlled devices and industrial machines
- Voice control in Smart Homes
- Speech assistants
- Intercom systems in industrial environments
- Video conferencing
- Acoustic monitoring of rooms

vicDIVA
SDK for Beamforming.



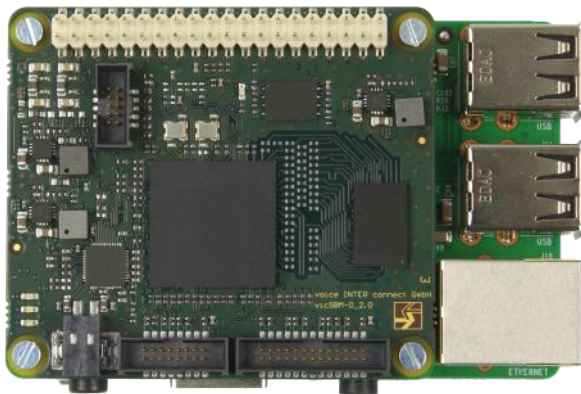
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Technical Data

vicDIVA evaluation kit consists of the following components:

vicSBM SoC Hardware Module

- Power Supply: 5 V
- Current consumption: max. 850 mA @ 5 V
- Operating temperature: -40°C ... 85°C
- Dimensions (LxWxH): 56.5 x 65 x 18.8 mm
- Form factor: double-sided SoC module
- Weight: 28 g
- Memory: 256 MByte DDR2-SDRAM, 64 MByte NOR-Flash



Picture 1: Processing unit consisting of Raspberry Pi carrier board and vicSBM signal processor HAT

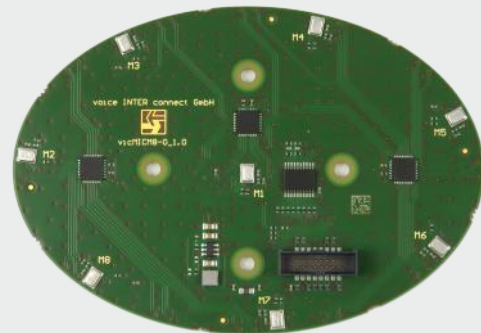
Pin Assignment (Inputs / outputs of the interfaces):

- Host:
 - 1 x UART
 - 1 x I²C
 - 1 x I²S (Stereo/TDM in+out)
 - 1 x SPI
 - 14 x GPIO
- Microphone array:
 - 1 x I²S (4 x Stereo / TDM in)
 - 1 x I²C
 - 1 x GPIO
- Aux audio:
 - 1 x I²S (4 x Stereo/TDM in+out)
 - 1 x I²C
 - 1 x GPIO
 - 2 x UART
- Loudspeaker: 1 W @ 4 Ohm
- Audio analog: Line Output, Stereo
Microphone Input, Mono

Combining microphone array interface and AUX audio interface, the board can receive and process audio from up to 16 digital microphones in I²S format.

Microphone Array

- Power Supply: 3.3 V
- Current consumption: max. 560 mA
- Operating temperature: -40°C ... 85°C
- Dimensions: 100 x 70 mm
- Form factor: PCB, double-sided
- Weight: 22 g
- In- / Outputs:
 - 1 x I²S (4 x Stereo out)
 - 1 x I²C (slave)
 - 1 x GPIO (in)



Picture 2: Microphone array with 8 MEMS microphones and 16 individually controllable RGB-LEDs

The digital audio data of the 8 MEMS microphones are available on 4 data lines in stereo I²S format. The word width of the audio data is 24 bits, the maximum sample rate is 48 kHz.

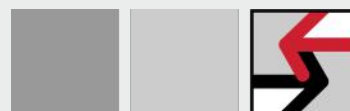
The 16 RGB LEDs are controlled via I²C controllers. The color value of each LED can be set separately.

Raspberry Pi 3 Host System

- Acquisition of cleared audio signal via Codec interface (I²S, I²C)
- Configuration of vicSBM (via ALSA):
 - Beamforming methods
 - Performance of noise reduction
 - Output volume
 - Installation location (wall, ceiling, table)
- Demo application for voice control via Amazon or Google
- SD card
- Power supply

vicDIVA Beamforming Evaluation Kit

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