Acusis S

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Beam-Forming Linear Microphone Array with Stereo AEC

Acusis S is an XMOS-based beam-forming array microphone PCB that can be integrated into an appliance to enable robust voice capture at a distance. PDM microphones, XMOS XVF3500 DSP, and Philips BeClear™ work to enhance far-field audio input for crystal-clear voice recognition.

Ideal for kiosk, voice control and video conferencing applications, Acusis S can also cancel your computer audio output from the microphone pickup, eliminating echo. Acusis S works out-of-the-box with a USB cable.

Your computer will see Acusis S as a microphone as well as a speaker, allowing you to optionally pass your computer audio through it via the audio jack for echo-cancellation. It also comes with a MacOS™/Linux™/Windows™ configuration tool to allow you to fine-tune the Acusis S for your desired application and environment.

Benefits & Features

Far-field reception

Automatic echo cancellation

Voice control

Beamforming

Dereverberation

Noise suppression

Philips BeClear™ Speech Processing

Stereo or mono pass-through

MIC audio out

Mute with indication

Plug & play

Tunable

USB UAC1 and UAC2

PDM Microphone Array with XMOS DSP

Applications

Voice assistants

Home or office teleconference

Kiosks

Voices muffled by masks

Interactive and smart monitors

Voice control, TVs, set-top boxes, home automation

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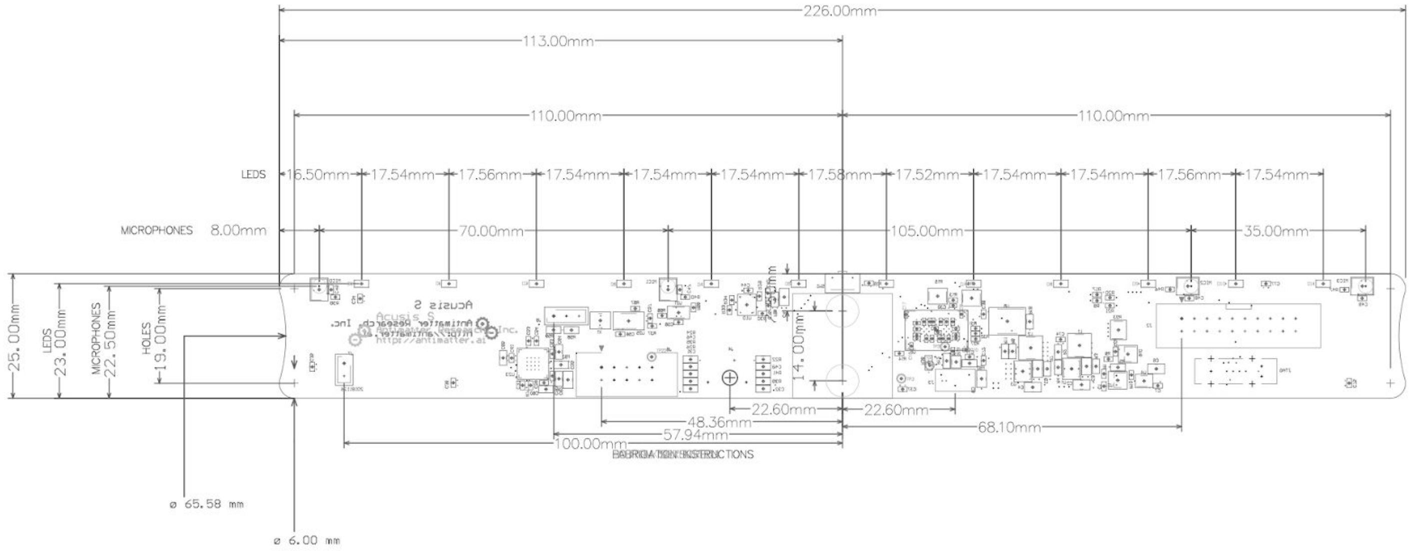
Specifications

Dimensions	225mm x 25mm x 18mm
Weight	20g
Power	USB-powered
Microphones	4 PDM, AGC
LEDs	12 red
Mute button	Yes
Chipset	XMOS - XVF3500
Echo-Cancellation	Full-duplex AEC Barge-in support, up to 50dB attenuation
Far-field	4-microphone adaptive beamformer
MIC audio out	USB UAC1/2, or 3.5mm mono
Line level out audio	3.5mm stereo or mono
Noise Suppression	Up to 15dB attenuation
Operating system	Ubuntu 18.04 LTS 64 bit, Windows 10, MacOS

Mechanicals



Step file: https://acusis.s3-us-west-1.amazonaws.com/AcusisS.step.zip

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Firmware Updates

Stay tuned for any firmware updates by visiting our website at antimatter.ai/acusis-s.

Acusis S Configuration Tool (aconfig)

We've developed our own Acusis S config tool (**aconfig**) to allow us to easily tune XVF3500 parameters from a host computer. Please check out XMOS (https://www.xmos.ai/) and XCore forum (https://www.xcore.com/) for more help and details on the parameters available for XVF3500.

Downloads

https://acusis.s3-us-west-1.amazonaws.com/aconfig_linux.tgz
https://acusis.s3-us-west-1.amazonaws.com/aconfig_mac.zip
https://acusis.s3-us-west-1.amazonaws.com/aconfig_win.zip

Installation

The Acusis S config tool comes packaged in a zip file and consists of the executable (**aconfig** or **aconfig.exe**) and a necessary shared library. Unzip contents to a convenient location, such as your home or documents directory. (*Note: additional drivers may be needed to run aconfig.exe on Windows*)

To run, open a terminal window (terminal.app on the Mac^{TM}, cmd.exe on Windows^{TM}) and change to the directory where you saved the tool, then simply run `aconfig` plus any command-line options. Depending on your default path, you may need to explicitly refer to the current directory, i.e. `./aconfig` or `.\aconfig.exe`.

Linux Special Instructions

If you run into permissions issues when running the tool, usually the easiest way to fix it is to add yourself to the dialout group. This will allow non-root access to the virtual serial port used for configuration.

```
sudo usermod -a -G dialout $USER
```

You may need to uninstall the **modemmanager** package as it sometimes interferes with virtual serial devices.

```
sudo apt purge modemmanager
```

Quick Start

This section contains commonly used commands for configuring Acusis S. Please see XMOS XVF3500 documentation for all available parameters.

`aconfig --help`	Print command-line usage.

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`aconfig -l`	List connected Acusis S devices. Subsequent commands assume only a single Acusis S is connected, otherwise, you'll need to add the --device option to disambiguate.
`aconfig --info`	Display version info about the device.

`aconfig --setdevicemode uac2`
`aconfig --setdevicemode uac1`
	Switch to UAC 2.0 or back to UAC 1.0 mode. This will cause the firmware to restart, and if switching modes, it will show up as a new device.

`aconfig --getsettings`
`aconfig --getsettings > settings.json`
	Get and display all current settings. Output is in JSON format and can be redirected to a file, where settings can be edited and then saved with commands below. This is currently the easiest way to see what settings are available.

`aconfig --get BEAMWIDTH`	Get a single parameter, in this case current beamformer width. If using defaults, this will return 1, indicating a width of 180 degrees.
`aconfig --set BEAMWIDTH 0.866`	Set a single parameter, in this case beamformer width. To set a width of X degrees, set the parameter value to sin(0.5*X). In this case, we set the width to 120 degrees, so the parameter value is sin(0.5*120) = 0.866. Note that settings are not automatically saved to flash and will be lost when the device is unplugged or reset (see below for saving parameters).
`aconfig --setsettings -f settings.json`	Set multiple parameters using a JSON file, such as the one saved with --getsettings. Settings are not automatically saved to flash.

`aconfig --saveconfig "My settings" -f settings.json --slot 0`
`aconfig --selectconfig 0`
	Save a set of parameters to flash and then use them the next time the firmware restarts.

`aconfig --restart`	Restart firmware without having to unplug the device. Useful for reloading saved or default parameters.
`aconfig --listconfig`	List saved configurations and current active configuration, if any.
`aconfig --selectconfig default`	Go back to loading default config when firmware restarts.
`aconfig --eraseconfig --slot 0`	Erase a configuration from flash.
`aconfig --wipe`	Erase all configuration data from flash, reverting to defaults on next restart.

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