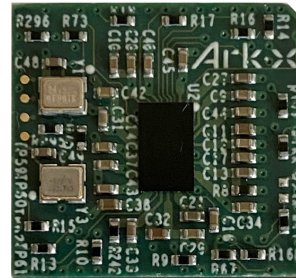# *EveryWord*™ Audio Front End (AFE) Module

FAR-FIELD VOICE AUDIO FRONT END (AFE) POWERED BY CIRRUS LOGIC TECHNOLOGY
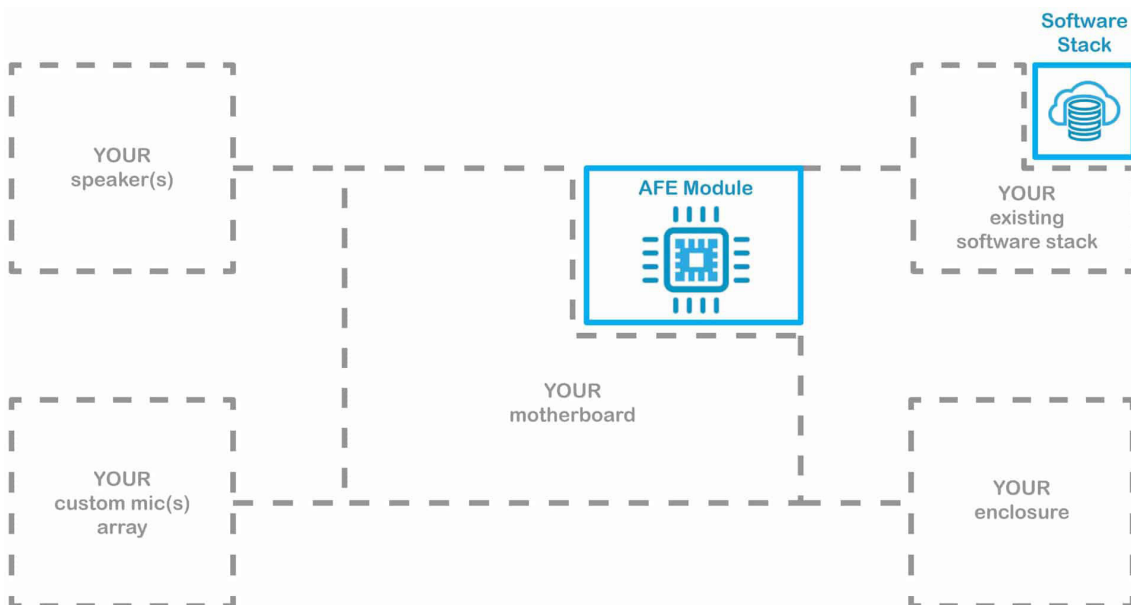
ADVANCED PERFORMANCE & PRODUCTION-READY

ArkX ultra far-field solutions significantly outperform existing OEM far-field technology while reducing your development costs, risks and time-to-market.

EveryWord™ AFE Module

The AFE Module can transform any existing product into a voice enabled product.

Clear Performance Advantages

- Captures voice commands:

    - from across the room **(>9 meters)**
    - in noisy and reverberative environments
    - during loud music/movies

- Unique ability to discriminate and suppress speech from TV

- Flexible placement: wall, in-wall, ceiling, dashboard
- Highly-integrated production-ready module

    - Works with most existing mic array designs
    - **Amazon AVS qualified (2 to 4 mics)**

- Ultra-low power battery operation for wake-on-word

Features Overview

- Cirrus Logic's SoundClear FlexArray™ voice technology
- 7 to 9 mic performance using only 3 to 4 mics
- Exceptional capture range of **(>9 meters)**
- H/W accelerated royalty-free Amazon wake-word engine
- Compatible with most PDM mic arrays
- Flexible mic array spacing and orientation (2D, 3D, vertical, horizontal)

- Onboard clocking
- For applications leveraging existing host/computer board
- ArkX host F/W for integration
- Eliminates need for high density PCB
- **Amazon AVS qualified (both 2 and 4 mics)**
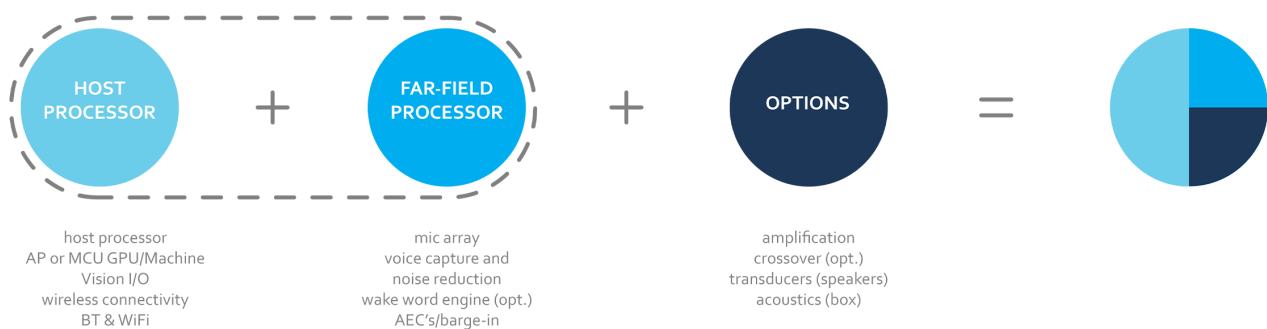
Technical Overview

- Supports linear, Y, square, triangular and 3D mic array geometries
- Proprietary 3D audio processing technology significantly outperforms beam-forming solutions
- Full-duplex far-field voice communication
- Does not require source ducking for reliable interaction
- Concurrent voice service and voice communication
- Multiple user tracking
- 2D & 3D GPU; 4-Lane MIPI DSI and CSI

- 4x bidirectional I^{2}S/TDM audio ports

    - 2x host to AFE
    - 2x available for external connection

- 12 AECs for superior barge-in and multichannel audio
- AEC support from mono to 5.1 channel surround
- USB Host, USB OTG, USB Audio
- GPIO, SPI and I^{2}C connectivity
- Web server-based console

AFE Quick Development Solution for Existing Platforms

OUR production-ready
EveryWord™ Voice Module

WE provide custom-designed
audio playback solutions

YOUR custom solution

HOST PROCESSOR   **+**   FAR-FIELD PROCESSOR   **+**   OPTIONS   **=**

host processor
AP or MCU GPU/Machine
Vision I/O
wireless connectivity
BT & WiFi

mic array
voice capture and
noise reduction
wake word engine (opt.)
AEC's/barge-in

amplification
crossover (opt.)
transducers (speakers)
acoustics (box)

EveryWord™ AFE Module System Overview

Legend:
- ArkX hardware
- Other hardware
- → Audio
- → Control
- → Voice

Audio Front End Module (AFE)
- far-field capture
- noise reduction
- AEC / barge-in
- playback enchancement

Optional:
- high accuracy Wake-Word-Engine (WWE)
- low power always-on WWE
- HD VOIP with in call WWE
- on-boarding clocking

System AP or MCU — SPI / RST / INT, I²S / TDM

optional other audio hardware — I²S / TDM

2 to 4 mic array — PDM

amplified speakers mono to 5.1 ch — I²S / TDM