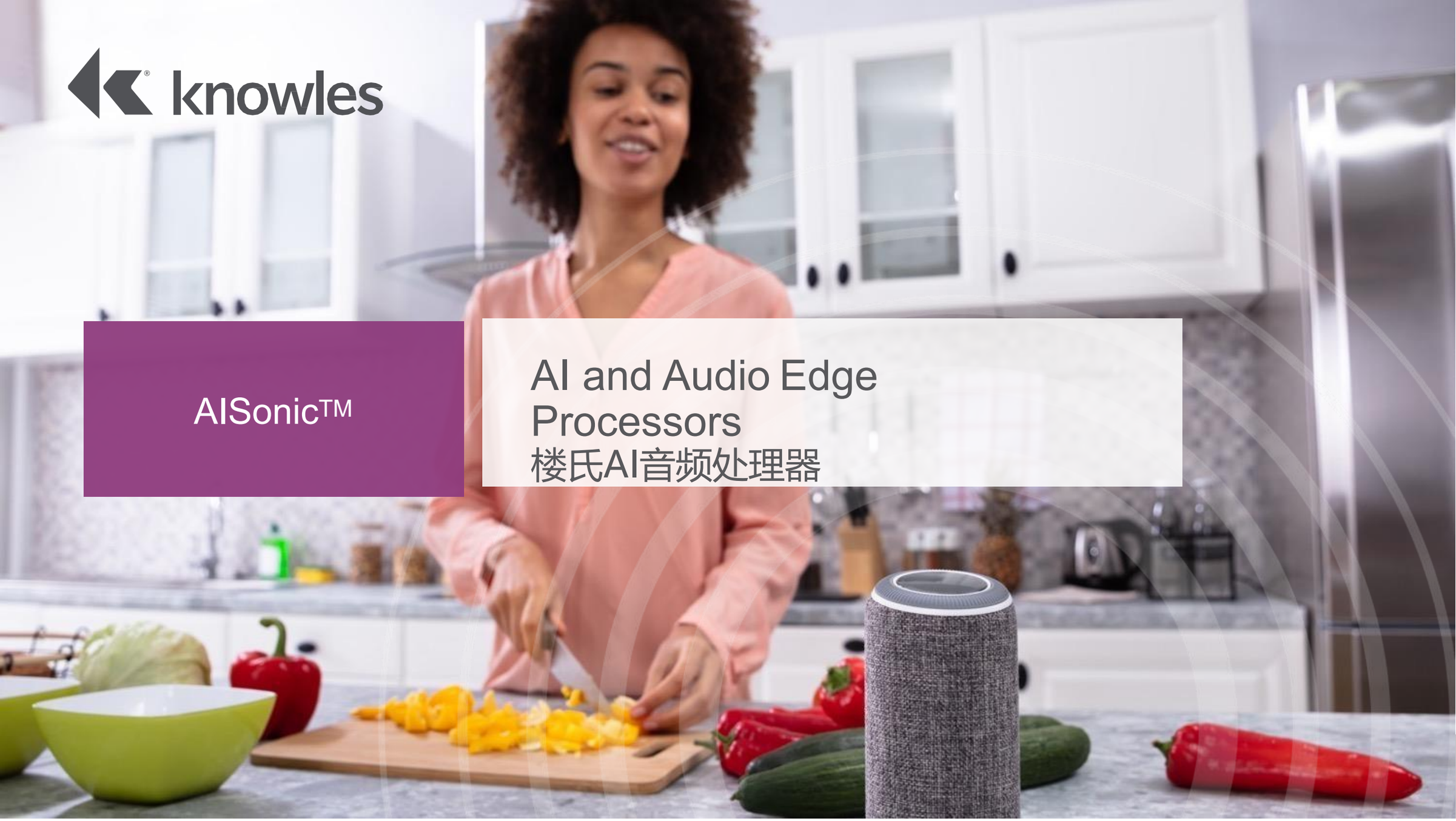
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AISonic™

AI and Audio Edge Processors
楼氏AI音频处理器

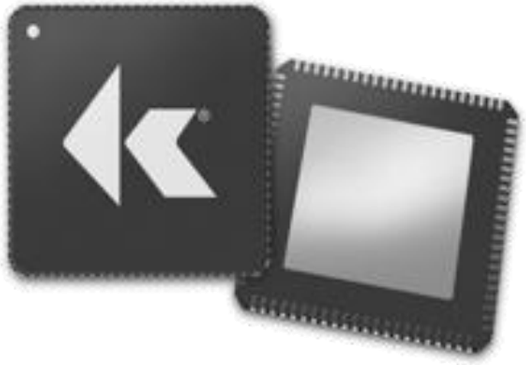


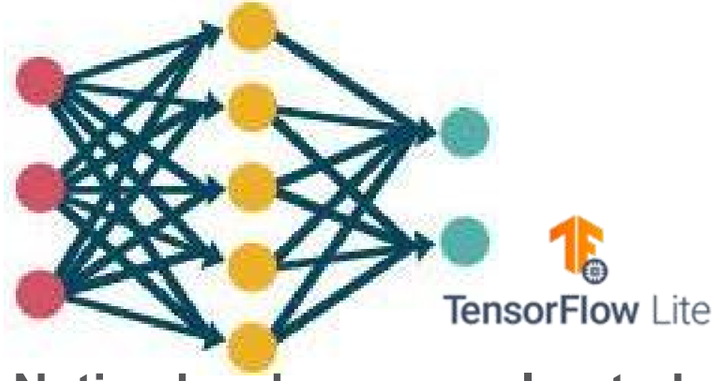
楼氏DSP核心价值 The Knowles Value Proposition



Advanced DSP algorithms built using Knowles instruction set

内置楼氏自有指令集及高级DSP 算法





Native hardware accelerated ML instructions for Neural Networks

具有神经网络功能，内置机器学习指令集及自然硬件加速功能

Knowles AISonic™ Edge Processor





高算力，超低功耗

Leading Compute Efficiency for long battery life

$$\frac{MOPS}{mW}$$



Reference System Solutions for Time to Market and Quality

成熟的生态系统， 多种参考设计方便您实现快速项目落地并市场化

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成功案例分享 AISonic™ Success Stories

从IA8201上市的一刻起，我们就已经在多个产品类别的应用中占据了领先位置，因为：

- 高性能的DSP, 同时具有极低的功耗表现，尤其适合使用电池的产品类别
- 极高的可扩展性，可以轻送实现与各种嵌入式平台的集成及应用



Bluetooth Speakers
Consumer and Enterprise

3-6mics



Smart TVs, Screens,
Monitors And Remotes

2 mics



IoT and Farfield
Devices

1-4 mics



White Goods and
Smart Homes

4-5 mics

Solution capable of multiple ASRs via Amazon Voice Interoperability Initiative, 2MB memory



OTE

6 mics

TBA

TWS

6 mics

Gaming Headsets, Enterprise OTE, and TWS with low power voice enhancement and output processing

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成功案例分享：蓝牙类 AISonic™ Success Stories (Bluetooth)







Polycom Sync Series
(Sync20/40/60)



B&O Enterprise Series



Jabra Evolve2 85 Series

BnO A Series

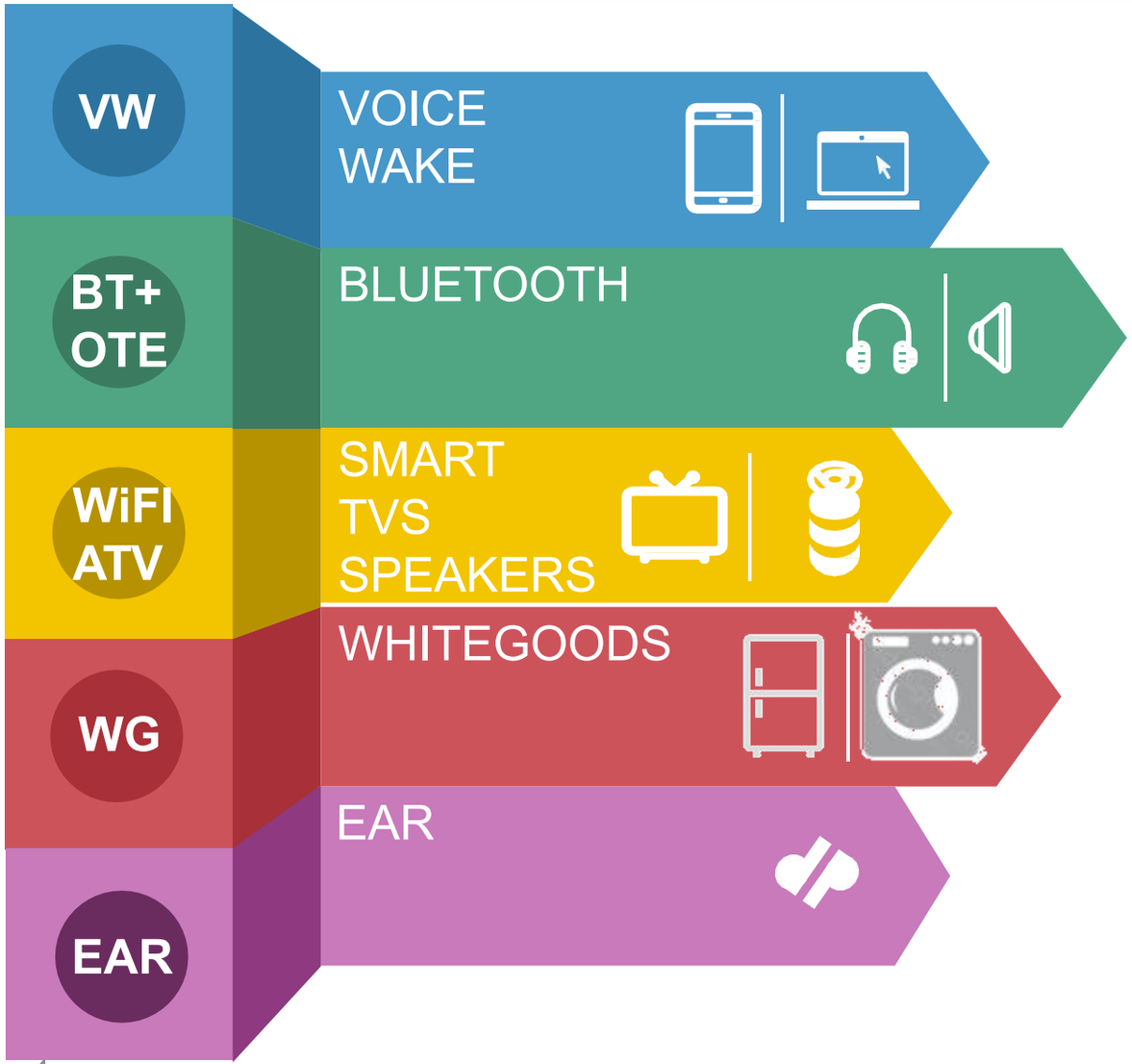


zoom

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多种参考方案 AISonic™ : New Reference Solutions Approach



遥控器，智能手机，平板，移动及可穿戴设备

消费及企业级蓝牙音箱，会议宝及会议系统

智能电视，智能显示器、平板、商显，智能音箱

智能家电产品

TWS耳机，头戴式耳机

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AISonic™
Edge Processors

Acoustic Challenges for VUI

Voice UI面临的声学挑战有哪些?

会议音箱 Conference Speakers

优异的
双讲性能





Range and AEC

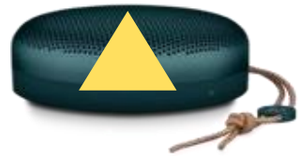
领先的算法合作伙

RETUNE DSP

ALANGO

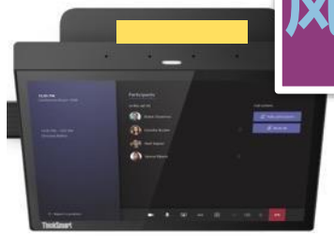
zoom

amazon alexa









波束成形及麦克风阵列

满足多个语音通话标准 及 认证需求

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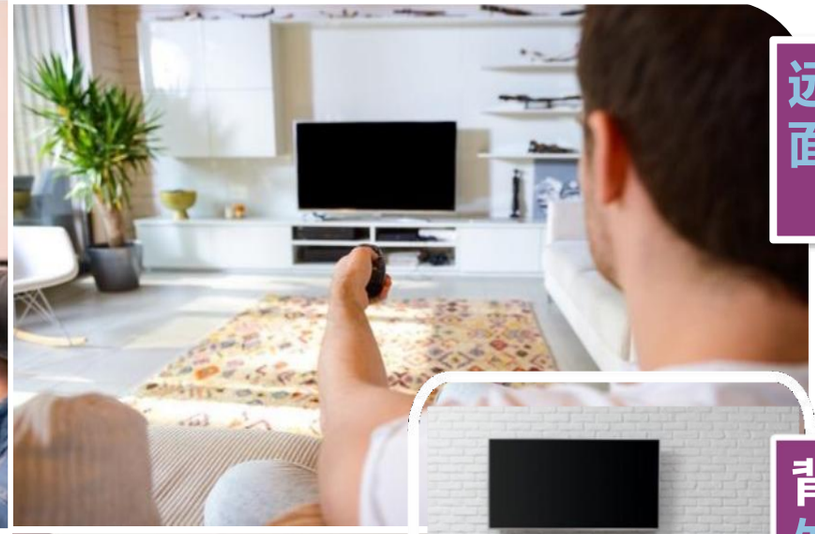
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智能电视 Televisions

–ve SER 条件下，大电视音量下的准确语音命令识别



远距离 及 大面积客厅



–ve SNR 条件下，强外部干扰源及嘈杂语音环境下的准确的语音命令识别



背景墙 下的 混响处理



Algorithm Partners

RETUNE DSP

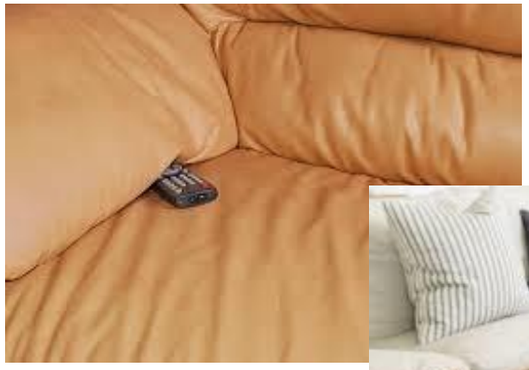
多声道输出环境 下的 准确语音命令识别

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遥控器Remote Controls

外部干扰导致的声学方面的挑战



麦克风被盖住了



“查找我的遥控器”或是 “按键语音”作为备选

全向 监听



IA8201 can compensate with multi-mic Algorithm

Low Power

# of Mics	Performance	Power Consumption mWHr/day
1	SNR>+5db Range: 1-2m	IA611; ~11mWhr/day
2	SNR>0db Range: 2-4m	IA700; ~7.5mWHr/day
3	SNR>-7db Range: >4m	IA8201; ~14mWhr/day

Algorithm Partners

RETUNE DSP

sensory

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白色家电White Goods











远距离 及 大面积使用环境

Algorithm Partners

RETUNE DSP

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sensory

–ve SNR 条件下，强外部干扰源及嘈杂语音下的准确的语音命令识别

麦克风阵列及摆放位置的调整及优化

风扇，马达，震动的降噪处理

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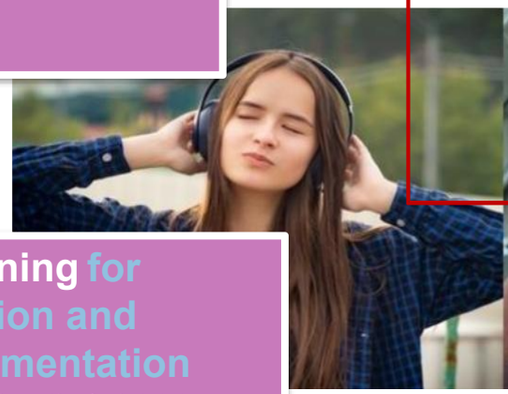
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TWS及头戴式耳机TWS and OTE Headsets

多麦波束成形 for 无咪杆设计及开放式的办公室

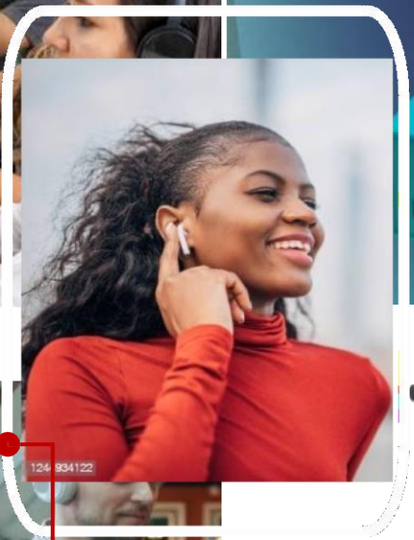


Voice Enhancement
人声增强





Machine learning for scene detection and Hearing Augmentation
用机器学习来提升为场景识别能力及听力增强





Output processing For Spatial Audio
针对声音输出的空间音频

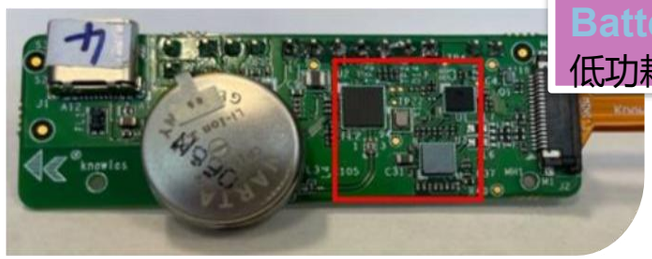
Algorithm Partners

Chatable

ALANGO

fluent.ai





Low power for long Battery Life
低功耗带来更长电池续航

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AISonic™ Edge Processor Roadmap 产品路线图

楼氏智能音频解决方案Knowles Intelligent Audio Solutions

IA611

Single-Core Top Port



Shipping

- Low power always-on voice wake
- DSP + Mic = smallest footprint
- Lowest system cost solution

NEW

IA700

Single-Core Low Power Edge Processor



- 100MHz HMD-Lite 32-bit core
- Pair with 2x Cornell2 Microphone for Beam Forming

IA8201

Dual-Core Audio Processor



Shipping

- 175MHz AU/ML cores with up to 128b data-path (4x 32-bit MACs/cycle)
- 1MB/4x PDM mic or 8x with TDM

NEW

IA8202

Extended Memory Quad-Core Audio Processor (Sampling Aug'22)



Discrete 2x 8201 Shipping

- Multi-channel AEC, Concurrent Voice UI ASR and Calling
- Ambient contextual detection
- Local ASR
- Low power VAD
- 2MB usable memory
- 8 mic inputs

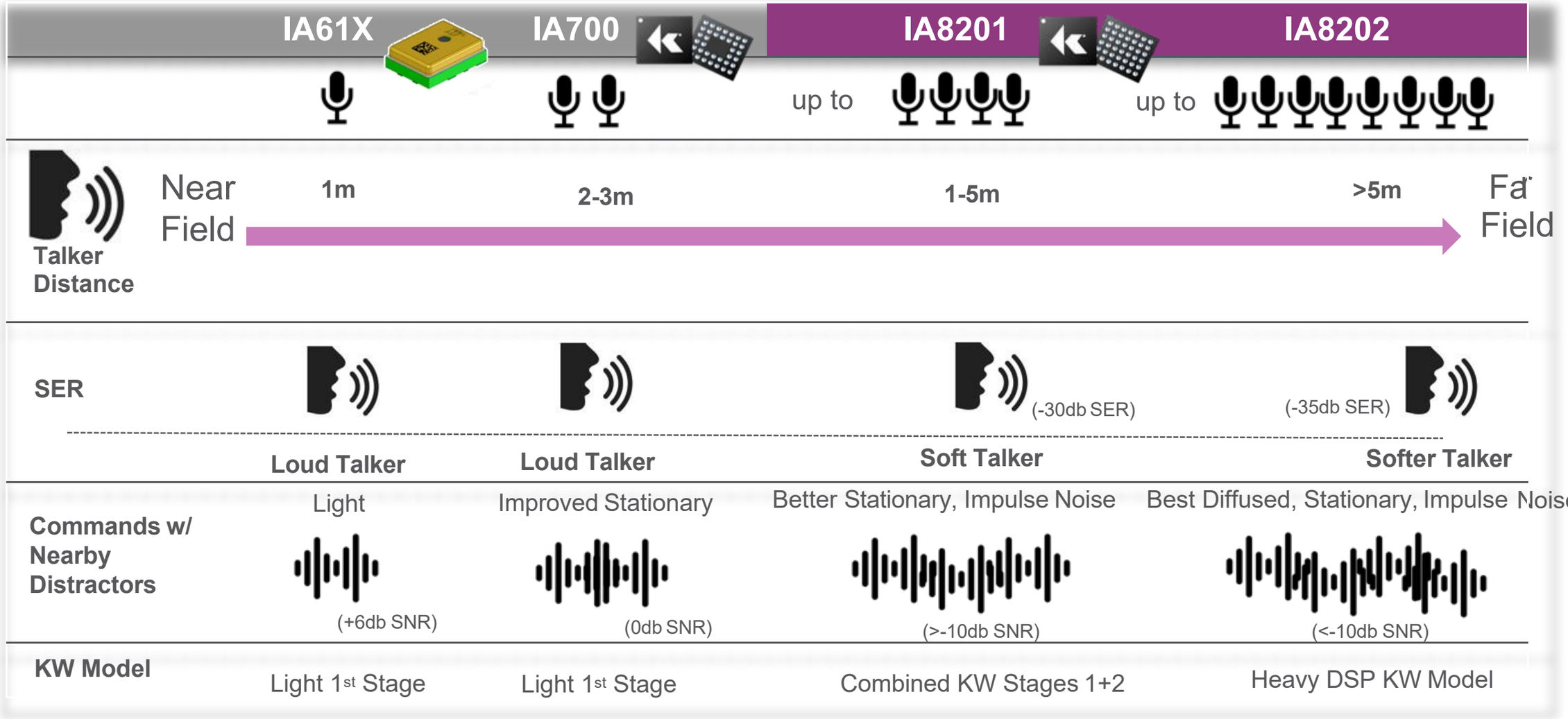
Edge Smart Mic | **Audio Edge Processors**

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应用简介Introduction to AISonic™ Products



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产品对比Product Comparison

Product	SmartMic	IA700	IA8201	IA8202
Memory	248kB (168kB User Avail)	248kB (168kB User Avail)	1.44MB (1MB User Avail)	2.88MB (2MB User Avail)
Size/Package	SPH (microphone) 3.50mm x 2.65mm x 0.98 9 pin	QFN 3.5mm x 3.5mm	LGA 3mm x 2.6mm QFN 6mm x 6mm	QFN 8mm x 8mm
Digital Audio IO	2x PDM in, 2x PDM out, 1x I2S/TDM	4x PDM in, 2xPDM out, 3x I2S/TDM (4ch in/out)	4x PDM in, 2xPDM out, 3x I2S/TDM (4ch in/out)	8 PDM in, 2x PDM out 8 I2S/TDM (8ch in/out)
# of Mics	1mic (integrated)	1 to 2 mics	1 to 4 mics	1 to 8 mics
Avail Sensor Interfaces	N/A	2x I2C, 2x SPI, GPIOs	2x I2C, 2x SPI, GPIOs	5x I2C, 3x SPI, GPIOs
Ports	1 I2C, 1 UART, 1 SPI GPIO	2x I2C, 2x SPI, 2 x UART, 8 GPIOs w/interrupts	2x I2C, 2x SPI, 2 x UART, 24 GPIOs w/interrupts	5x I2C, 3x SPI, 2x UART Up to 32 GPIOs w/ interrupts, 57 GPIOs total

开放的平台及生态系统 Open DSP: 3rd Party Developer Ecosystem

sensory

RETUNE DSP

ALANGO

Cyberon Just say it!

AISPEECH 苏州思必驰

SOUND+

fluent.ai

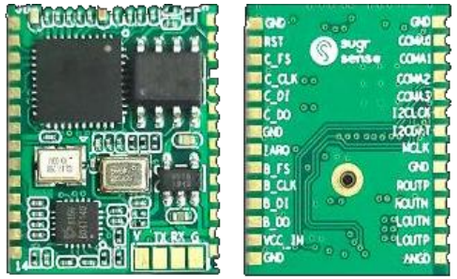
WAVES

TrillBit

Algorithms perform better on Knowles open DSP architecture

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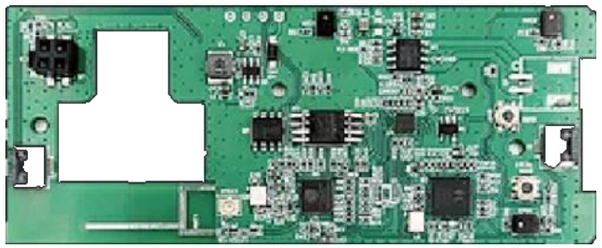
系统集成商模组展示 IA8201 Modules from System Integrators



Sugr w BLE



Sugr w USB



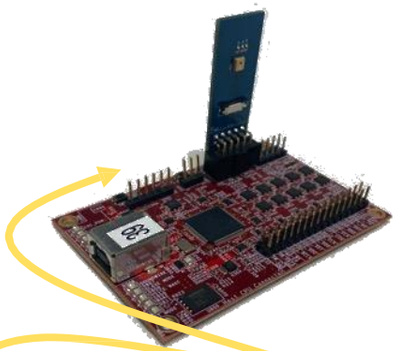
Sugr w WiFi



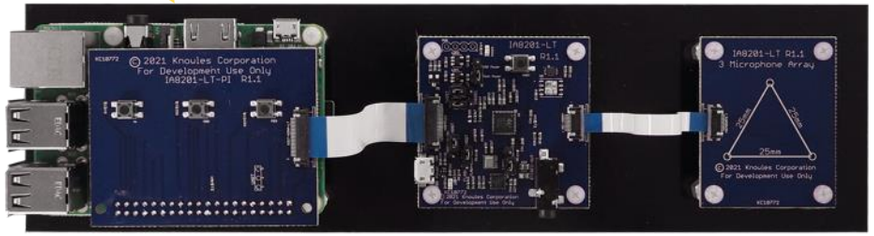
Libre with Wi-Fi
And AWS Integration

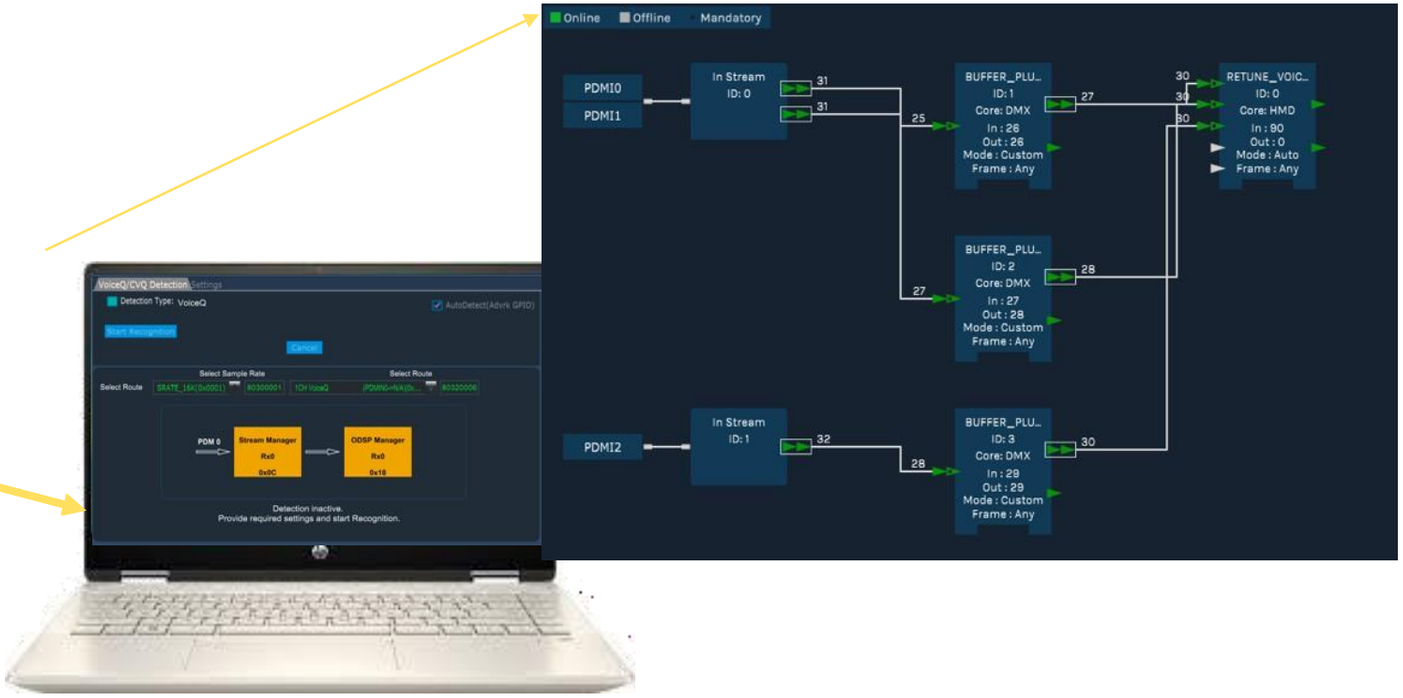
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开发板及算法开发工具 Development boards for algorithm development



USB





AUVID

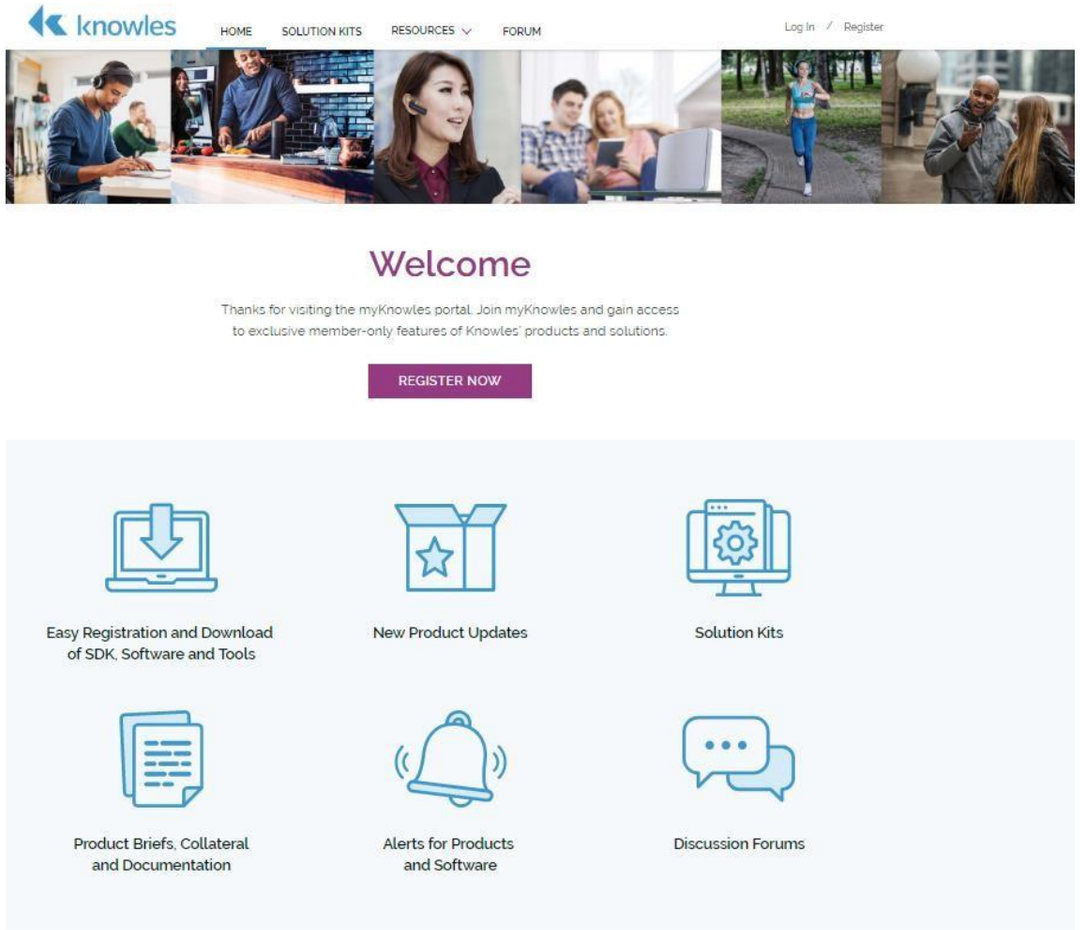
- A Knowles IDE for development, simulations and debugging
- SDK libraries provide access to intrinsics, plug-in framework

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AISonic™

Thank You