



SECURE CONNECTIONS  
FOR A SMARTER WORLD

# SOFTWARE FOR VOICE PROCESSING AT THE EDGE



## VOICE PROCESSING SOFTWARE

NXP offers a range of voice control, audio and communications software and systems solutions that provide high quality, reliable embedded speech processing for human-to-human and human-to-machine voice applications. NXP voice communication software offerings are designed for small footprint, low-power applications running on our portfolio of MCUs, MPUs, and DSPs.

## VOICE COMMUNICATION OFFERING

- Conversa Voice Communication Suite

## VOICE UI / CONTROL OFFERINGS

- VoiceSeeker Audio Front-End
- Voice Intelligent Technology (VIT) Wake Word and Voice Command Engines
- Voice Intelligent Technology Speech to Intent Engine
- VoiceSpot Wake Word & Acoustic Event Detection Engine

## PROFESSIONAL SERVICES

NXP can help you implement voice technology. We offer the following services throughout your product development cycle:

- Industrial design input for acoustic system
- Microphone and loudspeaker placement guidance
- Audio architecture review, advice and guidance
- Troubleshooting and audio path debug
- Evaluate prototypes and EV samples
- Preliminary tunings and test reports
- Final tuning and test reports
- Benchmarking against competitors

## VOICE COMMUNICATION



### CONVERSA VOICE COMMUNICATION SOFTWARE

Advanced full-duplex voice processing software that leverages traditional and machine learning techniques to provide excellent speech quality in all noise types. **Conversa** includes a real-time PC-based tuning tool that provides complete control of the audio signal path.

### APPLICATIONS

- Smart Watches and Wearables
- Gaming Headphones
- Smart Home Intercoms
- Personal and Group Conferencing
- Automotive Voice Communications
- Industrial Intercoms / Building Access

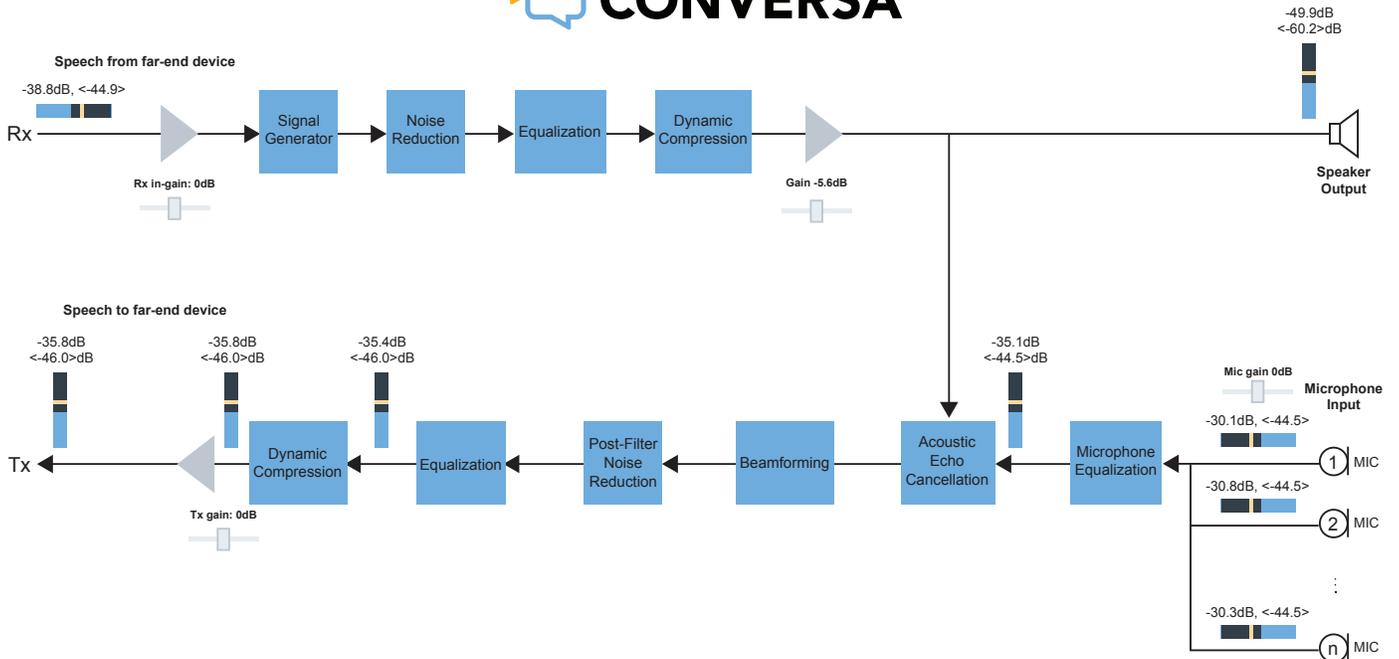
### FEATURES

- Complete uplink and downlink audio processing
- Wideband and super-wideband audio up to  $F_s=32$  kHz
- Acoustic Echo Cancellation (AEC)
- 55 dB total AEC including Nonlinear Processing (NLP)
- Traditional and machine learning based noise reduction
- Adaptive multi-mic beamforming
- Wind-noise and handling-noise cancellation

### SUPPORTED DEVICES

- Cortex M: i.MX RT Crossover MCUs, LPC55569
- Cortex A: i.MX 8M Plus

## CONVERSA COMMUNICATION SUITE FOR FULL-DUPLEX VOICE PROCESSING



## VOICE UI / VOICE CONTROL



### DESCRIPTION

Multi-microphone audio front-end signal processing solution for low-power, always-on devices. **VoiceSeeker** provides multi-mic beamforming, noise suppression, and multi-channel acoustic echo cancellation, enabling high performance far-field speech pickup.

### APPLICATIONS

- Smart Watches and Wearables
- Far-field Voice Control Systems
- Smart Home Controls
- Automotive Voice Controls
- Industrial Voice Controls

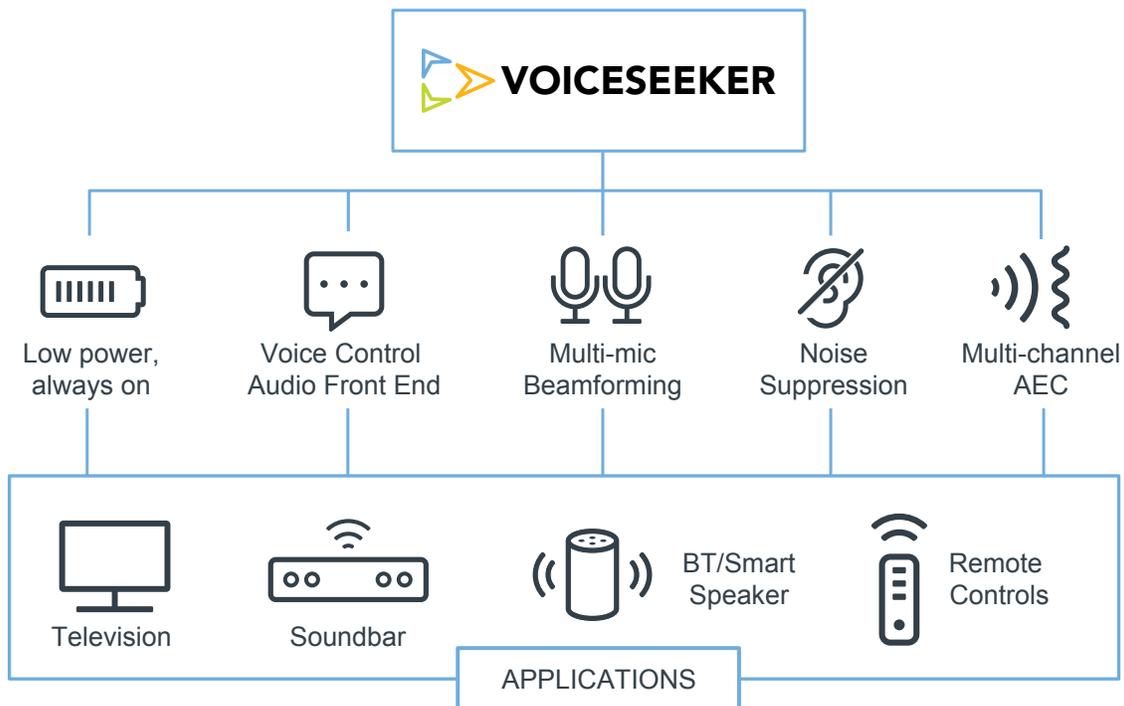
### FEATURES

- Flexible microphone geometries are supported
- Beamforming, noise reduction, dereverberation, payload capture
- Direction of arrival indication accurate up to 1 degree
- Optional multi-channel AEC available
- Integrates easily with VoiceSpot and VIT Engines
- Standard enablement without AEC included in MCUXpresso SDK

### SUPPORTED DEVICES

- Cortex M: i.MX RT Crossover MCUs
- Cortex A: i.MX 8M Mini, i.MX 8M Plus

## VOICESEEKER AUDIO FRONT-END VOICE UI SOFTWARE





# VOICE INTELLIGENT TECHNOLOGY WAKE WORD ENGINE AND COMMAND ENGINE

Standard offering

## DESCRIPTION

Free, fully comprehensive voice control software package for use with supported NXP devices and delivered as ready-to-use libraries in the MCUXpresso SDK. **Voice Intelligent Technology (VIT) Wake Word and Voice Command Engines** enable customer-defined wake words and commands using online model creation tools.

## APPLICATIONS

- Smart Watches & Wearables
- Smart Appliances
- Home Automation
- Robots
- Industrial HMI systems
- Automotive HMI systems

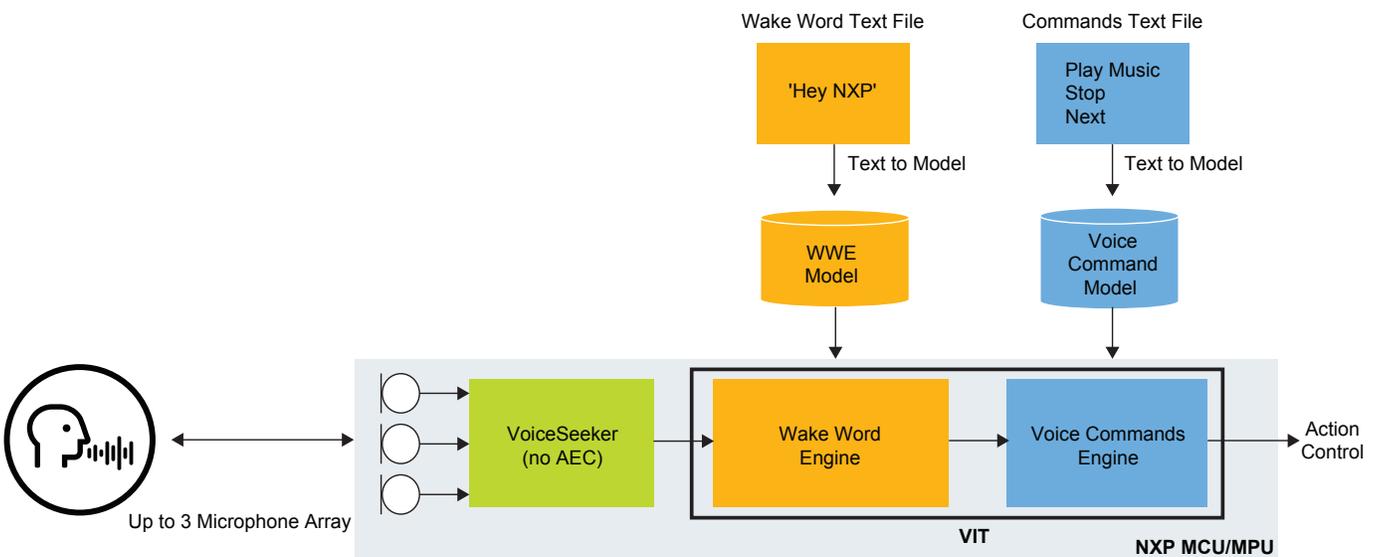
## FEATURES

- Free to use on supported NXP devices
- Always-on technology
- Custom wake word and command creation using Text to Model (no audio database required)
- **Self-service online VIT model generation tool**
- Integrates seamlessly with VoiceSeeker Audio Front End
- English, Mandarin, German, Spanish, Turkish, Japanese, Korean, French, and Italian language support
- Up to three wake words supported in parallel

## SUPPORTED DEVICES

- Cortex M: i.MX RT Crossover MCUs, RW61x, LPC55S69
- Cortex A: i.MX 8M Mini, i.MX 8M Plus, i.MX 9

## FAR-FIELD VOICE UI BLOCK DIAGRAM USING VOICESEEKER, VIT WAKE WORD AND COMMAND ENGINES





# VOICE INTELLIGENT TECHNOLOGY SPEECH TO INTENT ENGINE

*Premium offering*

## DESCRIPTION

A natural language understanding engine that leverages edge computing to enable local voice control. Designed to rival cloud-based systems' performance, **VIT Speech to Intent (S2I)** does not require a cloud connection, supporting improved user privacy, lower latency and reduced power consumption. S2I is part of our VIT software suite and allows people to speak naturally to smart machines rather than memorize precise commands or phrases to operate the devices.

## APPLICATIONS

- Smart Watches and Wearables
- Smart Appliances
- Home Automation
- Robots
- Industrial HMI systems
- Automotive HMI systems

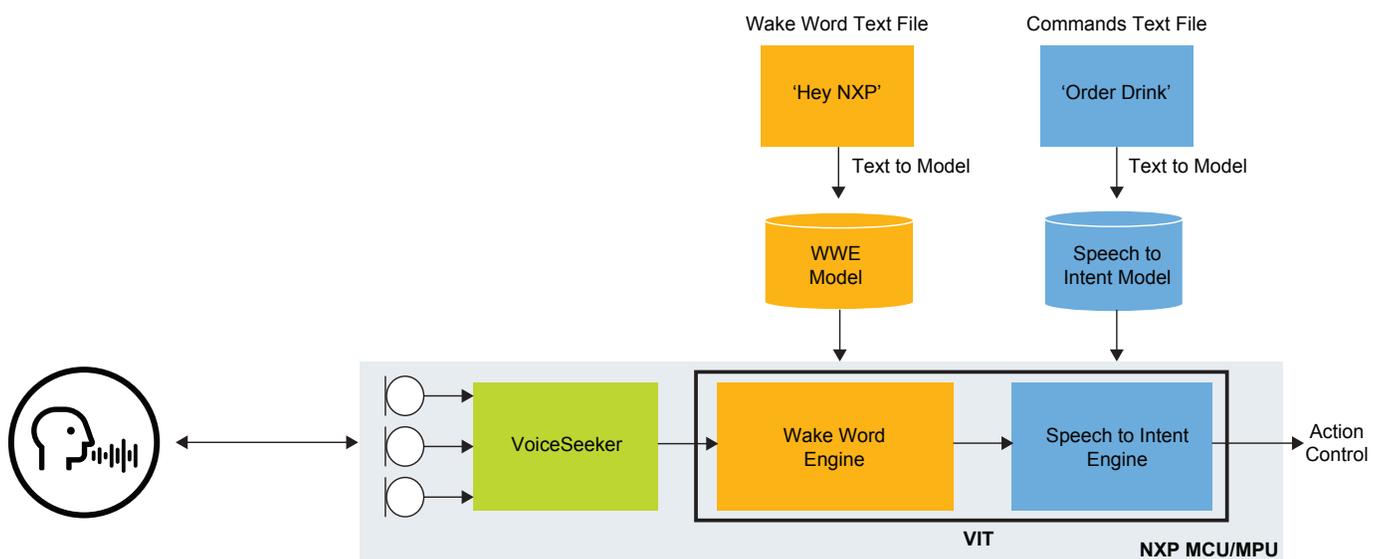
## FEATURES

- Offers a natural language understanding performance with HMI devices
- No cloud connection is required
- Can be configured with VoiceSeeker, our always-on VIT Wake Word Engine or VoiceSpot Wake Word Engine
- Language Support: English
- Available on several NXP platforms including Arm® Cortex®-M7, M33, A-53 or Cadence Xtensa® HiFi 4 and Fusion F1 cores.

## SUPPORTED DEVICES

- Cortex M: i.MX RT Crossover MCUs, RW61x
- Cortex A: i.MX 8M Mini, i.MX 8M Plus, i.MX 9

## FAR-FIELD VOICE UI BLOCK DIAGRAM USING VOICESEEKER, VIT SPEECH TO INTENT ENGINE



**DESCRIPTION**

Low latency, ultra-low power corpus-to-model wake word and acoustic event detection engine that performs well in noisy and high reverberation settings, using just a single microphone. **VoiceSpot** features an ultracompact memory footprint and low computational complexity.

**APPLICATIONS**

- Smart Watches & Wearables
- Smart Appliances
- Home Automation
- Robots
- Remote Controls
- Industrial HMI systems
- Automotive HMI systems

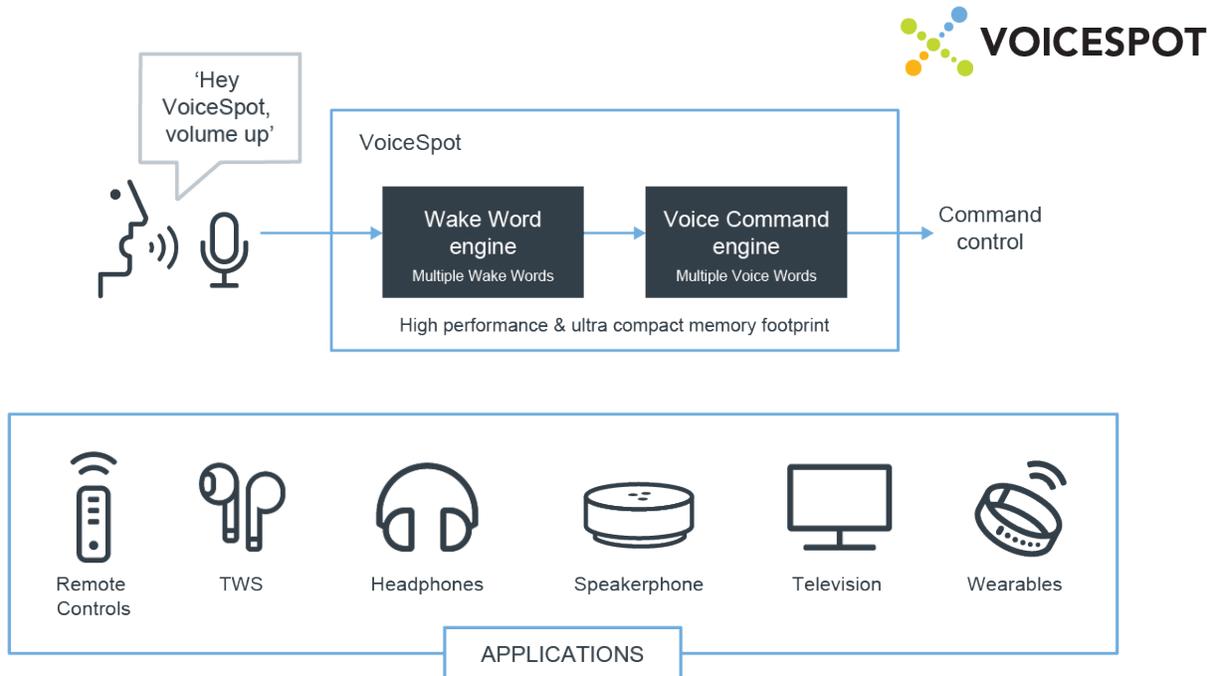
**FEATURES**

- Small memory footprint, <100kB including model, heap & program memory
- Low computational complexity allows always on functionality
- Low latency, up to 100ms faster response time than competing solutions
- Custom voice triggers and acoustic events are supported
- Multiple trigger instances are supported
- Compatible with MCUXpresso SDK

**SUPPORTED DEVICES**

- Cortex M: i.MX RT Crossover MCUs, RW61x, LPC55S69
- Cortex A: i.MX 8M Mini, i.MX 8M Plus

**VOICESPOT WAKE AND ACOUSTIC EVENT DETECTION ENGINE**



## VOICE UI SOFTWARE SELECTION GUIDE

	VOICESEEKER NO AEC	VOICESEEKER WITH AEC	VIT WAKE-WORD	VOICESPOT	VIT VOICE COMMAND	VIT SPEECH TO INTENT
<b>FUNCTION</b>	Audio Front End, Multi-microphone pre-processing	Audio Front-End multi-microphone pre-processing, Acoustic-Echo Cancellation (AEC)	Wake Word Engine	Wake Word Engine & Acoustic Event Detection	ASR Engine	ASR Engine
<b>BEST FOR</b>	Noisy Near-field & Far-Field Voice Pickup	Noisy Near-field & Far-field Voice Pickup in the presence of playback audio	Easily customized wake-words, supports rapid development cycles	Highest Performance Wake Word Engine, Low-Power, battery operated devices	Basic voice control with simple commands, supports rapid development cycles	Natural Language Voice UI, supports many expressions or ways of saying commands
<b>ONLINE TOOLS</b>	N/A	N/A	Yes	No	Yes	2H2024
<b>TRAINING CORPUS REQUIRED?</b>	N/A	N/A	No	Yes	No	No
<b>OTHER CONSIDERATIONS</b>	Must be evaluated together with VIT	Reference audio channel required	Customer self-service models	Training corpus required	Customer self-service models	NXP creates models for customer
<b>APPLICATIONS</b>	Smart Appliances, Remote Controls, Home Control (lighting, shades, thermostats)	Smart speakers, Smart TVs, Robots, Smart Watches	General Purpose Voice UI	Smart Watches, Remote Controls, TV ecosystem, security systems	Basic Voice UI with simple commands	Smart Appliances, Smart Watches, Home Control
<b>AVAILABILITY</b>	SDK, BSP	Controlled Release	SDK, BSP	Controlled Release	SDK, BSP	Controlled Release
<b>HOW TO GET STARTED</b>	<a href="http://www.nxp.com/vit">www.nxp.com/vit</a>	<a href="mailto:voice@nxp.com">voice@nxp.com</a>	<a href="http://www.nxp.com/vit">www.nxp.com/vit</a>	<a href="mailto:voice@nxp.com">voice@nxp.com</a>	<a href="http://www.nxp.com/vit">www.nxp.com/vit</a>	<a href="mailto:voice@nxp.com">voice@nxp.com</a>
<b>COST</b>	Free	Premium	Free	Premium	Free	Premium

[www.nxp.com/voice](http://www.nxp.com/voice)

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