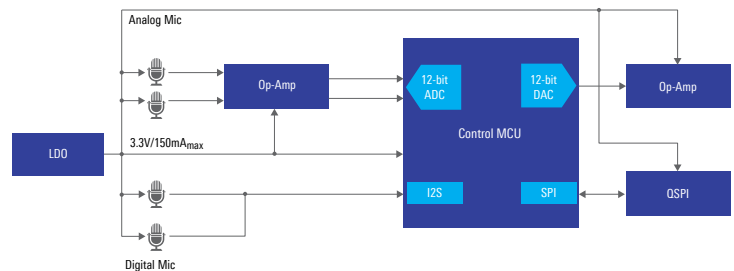# VOICE USER INTERFACE SOLUTION

Easy-to-use Reference Design with RA Family

The easy-to-use Renesas hardware platform for Voice User Interface (VUI) solutions is based on the high-performance RA family of 32-bit MCUs and is used for all VUI partner-enabled solutions within the Renesas Ready Partner Network. Each kit demonstrates how easy it is to control your system with a simple voice command interface without extensive coding experience or in-house expertise.

The reference kits enable local voice recognition without a network connection to allow designers to quickly start building an enhanced VUI in minutes that recognizes custom voice commands to trigger corresponding operations.

Hardware Features

- RA Arm® Cortex®-M23, M33, and M85 MCU
- Up to two digital and analog microphones, 6 additional MEMS DMIC board on VK-RA8M1 Mic-board
- External QSPI flash to store voice samples and library data
- Communication interfaces:
  – Pmod type 2A / 3A / 6A
  – USB type-C and micro-B
  – On board J-link Seggar debugger /programmer
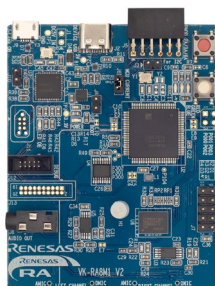- Stereo audio headphone jack
- Aux port

Software Features

- Cyberon DSpotter
  – Provides DNN based pre-trained voice model
  – User creates command by text input
  – Support for Online & Offline test options
  – Analyze recognition score
  – Tune performance real-time
  – Real-time tool to observe input voice waveform
- Cyberon DSpotterNLU to deploy Natural Language Understanding model with VK-RA8M1
- Aizip Voice Speaker ID support
- Audio Front End
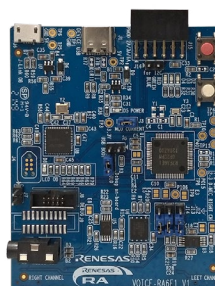- Voice Anti-Spoofing application example

Target Applications

- Edge application enabling endpoint voice user interface without network or cloud connections:
  – Home Automation
  – Consumer Electronics
  – Building Automation
  – City Infrastructure
  – Industrial Automation
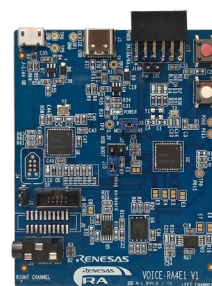 – Agriculture Transportation
  – Logistics
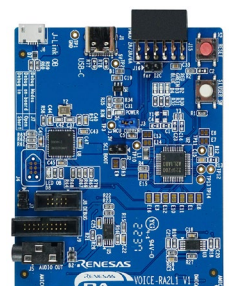 – Healthcare

Reference Kit

RA8M1 Voice User Reference Kit

RA6E1 Voice User Reference Kit

RA4E1 Voice User Reference Kit

RA2L1 Voice User Reference Kit

VOICE USER INTERFACE SOLUTION

Benefits

- Local voice trigger and command recognition
  – Endpoint capable, no need of network connection
- Robust noise reduction, high-accuracy performance, very small footprint
- Enables command customization, performance tuning, testing
  – Quick command customization / optimization by model adaptation with only a small amount of speech data
- Voice Activity Detection (VAD) and audio playback
  – Reduces power consumption, provides snooze mode, enables voice response function

- Voice Anti-Spoofing enables safety by distinguishing between real human and recorded voice
- Audio Front End enhances audio / noise resistance capabilities with noise cancellation, beamforming and direction of arrival
- Speaker ID enables safety and personalization with user identification
- Partner-enabled application examples and cloud GUI tool
  – Phoneme-based modeling for quick command customization without collecting speech data in advance and model adaption with small amount of speech data
  – Separation of recognition engine and command model, switching commands dynamically
  – NLU cloud GUI tool available for VK-RA8M1

44+ Languages Supported

European Region
UK English   Polish

German   Czech
French   Danish
Italian   Turkish
Spanish   Finnish
Portuguese   Norwegian
Russian   Swedish
Dutch   Greek
Slovak   Hungarian
Ukrain

Asian Region
Traditional Chinese
Simplified Chinese
(Chinese Accent English)
Cantonese
Korean   Hindi
Japanese   Vietnam
Thai   Bahasa

American Region
Northern American English
Brazilian Portuguese
Southern American Spanish

Australian Region
Australian English

Ordering Information

Part Number	Description
RTK0EG0005D00001BE	RA8M1 Voice reference kit with Natural Language Understanding and anti-spoofing
TW001-VUIA6E1POCZ	RA6E1 Voice reference kit with multi-language support and anti-spoofing
TW001-VUIA4E1POCZ	RA4E1 Voice reference kit with command recognition
TW001-VUIA2L1POCZ	RA2L1 Voice reference kit with low MHz consumption

Get more details and request a kit at: renesas.com/voice-recognition

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