RENESAS

RISC-V 32-BIT MCU
ASSP EASY FOR VOICE HMI

ASSP EASY MCU for Voice HMI Based on RISC-V

The R9A06G150 RISC-V MCU ASSP is specifically optimized for voice and sound triggered human machine interfaces. Alongside ecosystem partners, this provides a complete, production-ready keyword spotting and recognition system solution at the edge. Users can add voice control functionality easily with this cost-effective solution. It enables the shortest time to market with pre-developed production-ready software, avoiding upfront investments and without requiring specialty expertise.
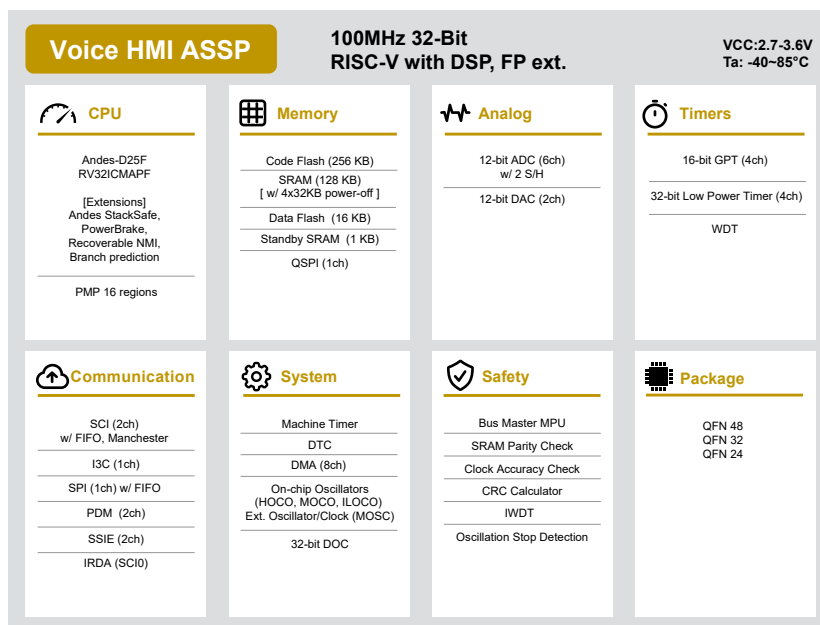
Target Applications

- Home / Building automation
- Consumer
- Healthcare
- Interactive toys
- Intelligent mirrors and displays
- Home appliances such as air conditioners, heating systems, lighting control, access controls

Key Features

- 100 MHz CPU with DSP instructions, floating-point support
- PDM, SSI (I2S, TDM), ADC, DAC for microphone and codec interface
- Low power consumption
- Controlled by external host I/F via SCI/ UART, SPI, I3C or I2C
- Small package support (QFN 48, 32, 24)
- 256KB program flash / 128KB RAM memory, 16KB data flash
- QSPI interface for easy memory expansion
- Customizable parameters & application options

Block Diagram

Voice HMI ASSP

100MHz 32-Bit RISC-V with DSP, FP ext.

VCC:2.7-3.6V
Ta: -40~85°C

CPU
Andes-D25F RV32ICMAPF

[Extensions] Andes StackSafe, PowerBrake, Recoverable NMI, Branch prediction

PMP 16 regions

Memory
Code Flash (256 KB)
SRAM (128 KB) [w/ 4x32KB power-off]
Data Flash (16 KB)
Standby SRAM (1 KB)
QSPI (1ch)

Analog
12-bit ADC (6ch) w/ 2 S/H
12-bit DAC (2ch)

Timers
16-bit GPT (4ch)
32-bit Low Power Timer (4ch)
WDT

Communication
SCI (2ch) w/ FIFO, Manchester
I3C (1ch)
SPI (1ch) w/ FIFO
PDM (2ch)
SSIE (2ch)
IRDA (SCI0)

System
Machine Timer
DTC
DMA (8ch)
On-chip Oscillators (HOCO, MOCO, ILOCO) Ext. Oscillator/Clock (MOSC)
32-bit DOC

Safety
Bus Master MPU
SRAM Parity Check
Clock Accuracy Check
CRC Calculator
IWDT
Oscillation Stop Detection

Package
QFN 48
QFN 32
QFN 24

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Partners

The chip is pre-programmed at the Renesas factory with specialized application code developed by independent third parties. Those partners have demonstrated specialized expertise in the development and integration of keyword spotting and voice driven user interfaces. Their proven customer support capability ensures successful project completion and secures the transition to the mass-production stage. The strongly collaborative solution with those partners is a fundamental value proposition and the key to success.

ORBSTAR International Co., Ltd.
https://www.orbstar.com.tw

ORBSTAR International Co., Ltd. is located in Taipei, Taiwan. ORBSTAR is a leading company selling, marketing and developing a range of embedded software solutions including RTOS, stacks, development tools, turnkey solutions and professional services. Focusing on Embedded Software business, ORBSTAR has deep and proven experience in embedded application development and support.
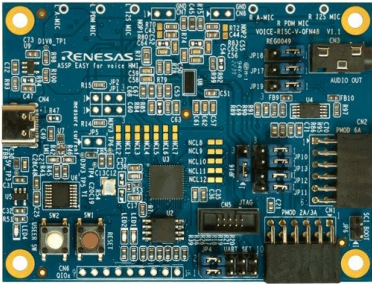
Cyberon Corporation
https://www.cyberon.com.tw

Cyberon Corporation, headquartered in New Taipei City, Taiwan, is a leading speech solution provider. Its speech recognition and text-to-speech technologies have been widely adopted within many different applications. Cyberon provides a full range of voice solutions and is committed to providing users with natural and convenient human-machine voice interfaces.

Evaluation Kit

R9A06G150 ASSP EASY Voice HMI Kit

The ASSP EASY Voice HMI Kit is based on the R9A06G150 RISC-V ASSP. It is an edge voice recognition development kit designed to evaluate the functionality of projects developed by Renesas Ready Ecosystem partners and to facilitate the development of additional partner projects.

The kit demonstrates a complete reference design and is supported by easy-to-use PC GUIs/configuration tools for easy evaluation.

Reference part number: **TW001-VUI-RISCVPOCZ**

Ordering References

Flash	256KB	R9A06G1502GNK	R9A06G1502GNH	R9A06G1502GNE
RAM	128KB			
DataFlash	16KB			
Pin Count		24pin	32pin	48pin
Package		QFN	QFN	QFN
Size (body)		4x4mm	5x5mm	7x7mm
Pitch		0.5mm	0.5mm	0.5mm
Operating Temperature		-40 to +85°C	-40 to +85°C	-40 to +85°C

For more details, please visit: renesas.com/risc-v