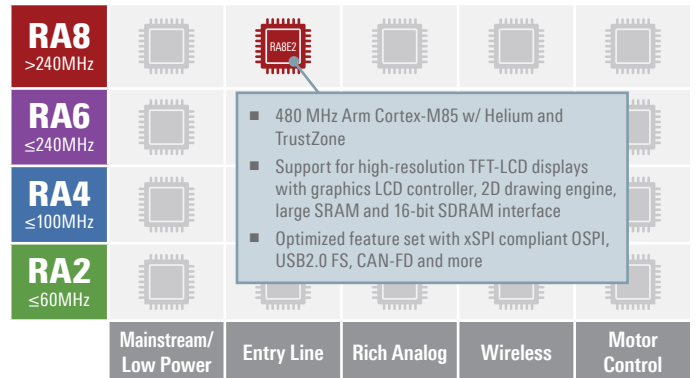# 32-bit MCU Family
RENESAS RA8E2 GROUP

480 MHz Arm® Cortex®-M85® Based Entry Line Graphics Microcontroller with Helium™ and TrustZone®

The Renesas RA8E2 MCU Group are entry line graphics-enabled 32-bit MCUs based on the Arm Cortex-M85 (CM85) core with Helium and TrustZone delivering breakthrough performance of over 3000 Coremark points at 480 MHz and graphics capabilities that drive TFT-LCD displays. These MCUs address diverse high-performance graphics applications in industrial and home automation, office equipment, healthcare, and consumer products. RA8E2 MCUs integrate the high-performance CM85 core with large memory and an optimized peripheral set, including a graphics TFT-LCD controller with parallel RGB interface, 2D drawing engine and multiple external memory interfaces that addresses the needs of price-sensitive graphics applications. These MCUs are available in 224-pin packages and fully supported by the Flexible Software Package (FSP) and a comprehensive set of hardware and software development tools.
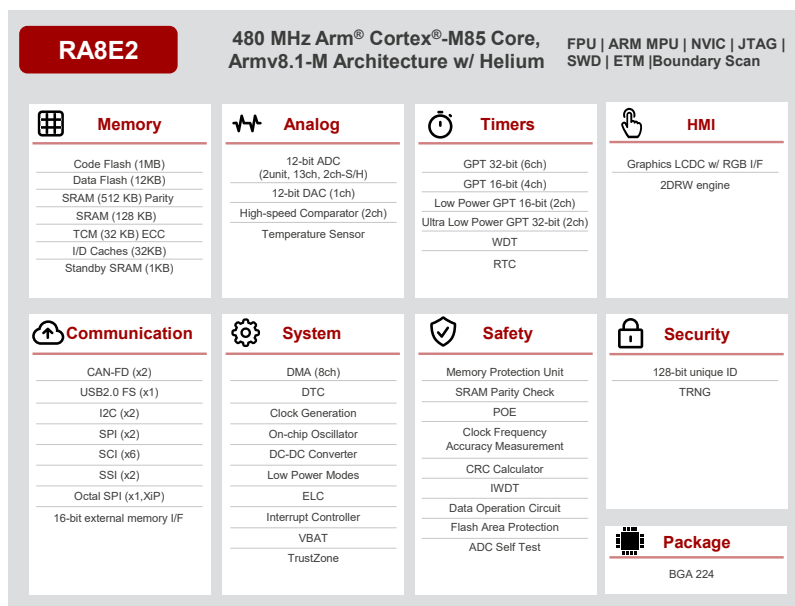

- 480 MHz Arm Cortex-M85 w/ Helium and TrustZone
- Support for high-resolution TFT-LCD displays with graphics LCD controller, 2D drawing engine, large SRAM and 16-bit SDRAM interface
- Optimized feature set with xSPI compliant OSPI, USB2.0 FS, CAN-FD and more

Key Features

- 480MHz Arm Cortex-M85 with Helium MVE
- 1MB Flash memory and 672KB of SRAM including TCM
- 32KB I/D caches and 12KB Data Flash
- Graphics LCD controller with RGB interface
- 2D drawing engine
- 16 / 8-bit external memory interfaces (CS/SDRAM)
- ARMv8-M TrustZone security
- 224-pin BGA package
- 32 / 16-bit timers, 32-bit ultra-low-power timers
- 12-bit ADC, 12-bit DAC
- High-speed analog comparator
- USB 2.0 Full Speed

Target Applications

- Industrial HMI, Machine Vision
- Consumer products with displays
- Smart home, Building automation
- Office automation
- Healthcare monitoring and imaging
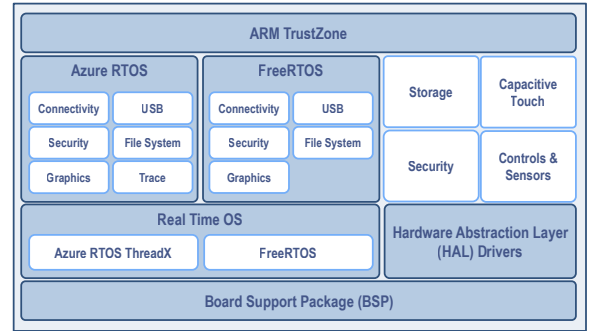- Voice AI applications

Block Diagram

RENESAS RA8E2 GROUP

Software Package

The Renesas Flexible Software Package (FSP) is designed to provide easy-to-use, scalable, high-quality software for embedded system designs using RA MCUs.

The FSP is based on an open software ecosystem of production-ready drivers, supporting Azure® RTOS, FreeRTOS™ or bare-metal programming. It also includes a selection of other middleware stacks, providing great flexibility for migrating code from older systems or developing new applications from scratch.

Tools and Support

The e² studio IDE provides support with intuitive configurators and intelligent code generation to make programming and debugging easier and faster.

IDE	Renesas e²studio	Keil MDK	IAR EWARM
Compiler	• GCC • LLVM • Arm Compiler* • IAR Arm Compiler*	• Arm Compiler*	• IAR Arm Compiler*
Debug Probe	• Renesas E2/E2 Lite • SEGGER J-Link	• SEGGER J-Link • Keil ULINK / CMSIS-DAP (limited support)	• IAR I-jet • SEGGER J-Link • Renesas E2/E2 Lite • CMSIS-DAP (limited support)
Production Programmer	• Renesas PG-FP6 • SEGGER J-Flash • Partner solutions		

* Compiler must be purchased and licensed directly from third party

Evaluation Kit

- RA8E2 Evaluation Kit enables users to evaluate the features of RA8E2 using rich onboard features along with popular ecosystem expansion connectors
- Onboard debug using SEGGER J-Link
- The EVK will be available in Q1 2025, EK-RA8D1 can be leveraged for evaluation in the interim
- Orderable part number: **RTK7EKA8E2S01001BE**

Ordering References

Flash/RAM	Tj	R7FA8E2AFDCBD
1MB / 672KB	-40 to 105 °C	
Pin Count		224-pin
Package		BGA
Package size (body)		13 x 13 mm
Pitch		0.8 mm

For more details, please visit: **renesas.com/ra8e2**