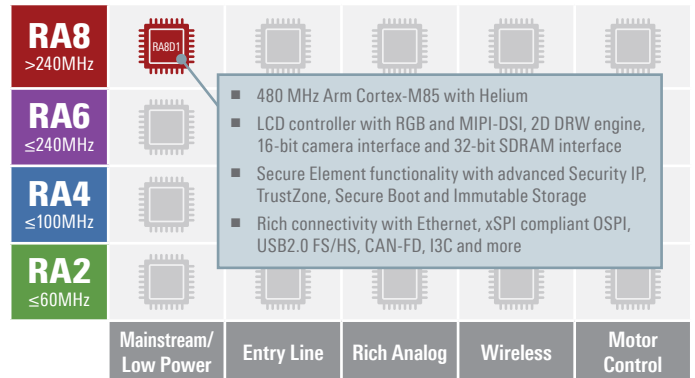


32-bit MCU Family

RENESAS RA8D1 GROUP

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

The Renesas RA8D1 group are the industry's first 32-bit graphics-enabled MCUs based on the Arm Cortex-M85 (CM85) core, delivering breakthrough performance of over 3000 Coremark points at 480 MHz and superior graphics capabilities that enable high-resolution displays and Vision AI applications. RA8D1 MCUs integrate the high-performance CM85 core with large memory, a high resolution TFT-LCD controller with parallel RGB and MIPI-DSI interfaces, 2D drawing engine, 16-bit camera interface, multiple external interfaces and a rich peripheral set optimized to address diverse application requirements. These MCUs are available in 176- and 224-pin packages to meet the requirements of a broad range of graphics and AI applications. Secure Element-like functionality is built-in with advanced cryptographic Security IP, immutable storage and tamper protection, for truly secure IoT.



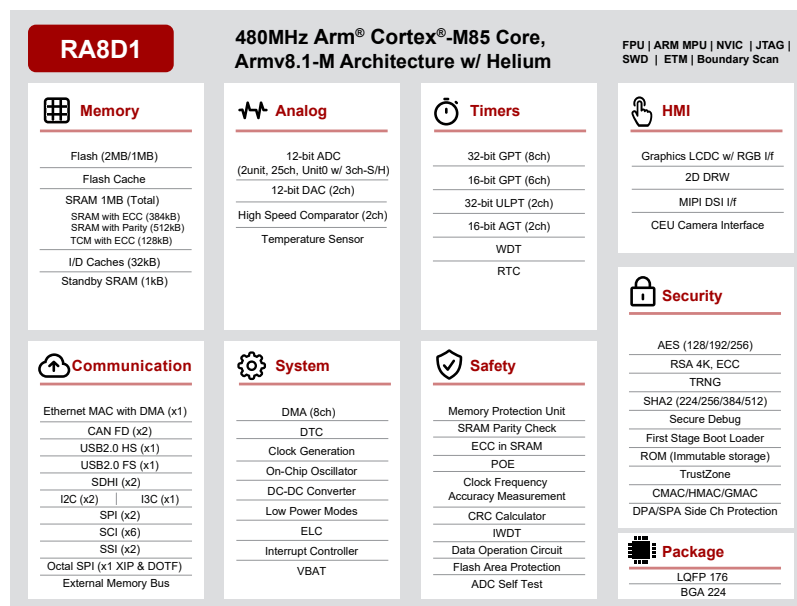
Key Features

- 480 MHz Arm Cortex-M85 with Helium MVE
- 1MB - 2MB Flash, 1MB SRAM including TCM
- 32KB I/D Caches and 12KB Data Flash
- Graphics LCD controller with RGB & MIPI-DSI I/Fs
- 2D drawing engine, 16-bit CEU camera interface
- xSPI-compliant Octal SPI with XIP and DOTF
- Renesas Security IP and Armv8-M TrustZone
- Immutable storage for First Stage Bootloader
- 32/16-bit timers, 32-bit ultra-low-power timer
- 12-bit ADC, 12-bit DAC, HS comparator
- Ethernet, USB2.0 HS/FS, CAN-FD interfaces
- 32-bit external memory I/F (CS/SDRAM)

Target Applications

- Industrial HMI, Machine vision
- Video doorbells, Security cameras
- Thermostats, Security panels
- Printer displays, QR code reader
- Patient health monitors
- People detection, Image classification

Block Diagram

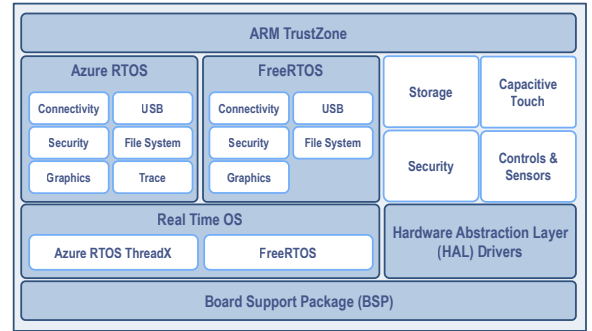


RENESAS RA8D1 GROUP

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 e ² studio	Keil MDK	IAR EWARM
Compiler	<ul style="list-style-type: none"> • GCC • LLVM • Arm Compiler* • IAR Arm Compiler* 	<ul style="list-style-type: none"> • Arm Compiler* 	<ul style="list-style-type: none"> • IAR Arm Compiler*
Debug Probe	<ul style="list-style-type: none"> • Renesas E2/E2 Lite • SEGGER J-Link 	<ul style="list-style-type: none"> • SEGGER J-Link • Keil ULINK / CMSIS-DAP (limited support) 	<ul style="list-style-type: none"> • IAR I-jet • SEGGER J-Link • Renesas E2/E2 Lite • CMSIS-DAP (limited support)
Production Programmer	<ul style="list-style-type: none"> • Renesas PG-FP6 • SEGGER J-Flash • Partner solutions 		

* Compiler must be purchased and licensed directly from third party

Evaluation Kit

- Evaluate key features of RA8D1 MCUs and develop edge and endpoint AI / ML, IoT, HMI, and other embedded systems applications
- Includes MIPI graphics expansion board (4.5 Inch backlit TFT display, 480x854 pixel resolution) and camera expansion board (Arducam OV3640)
- Features on-board debugging using SEGGER-J-Link®
- Order the kit and download documentation, design package, development tools, and software at: renesas.com/ek-ra8d1
- Orderable part number: **RTK7EKA8D1S01001BE**



Ordering References

Flash/RAM	Tj			
2MB/1MB	-40 to 125 °C	w/o MIPI-DSI	R7FA8D1AHECFC	R7FA8D1AHECBD
		w/ MIPI-DSI	R7FA8D1BHECFC	R7FA8D1BHECBD
1MB/1MB	-40 to 125 °C	w/o MIPI-DSI	R7FA8D1AFECFC	R7FA8D1AFECBD
		w/ MIPI-DSI	R7FA8D1BFECFC	R7FA8D1BFECBD
Pin Count			176-pin	224-pin
Package			LQFP	BGA
Package size (body)			24 x 24 mm	13 x13 mm
Pitch			0.5 mm	0.8 mm

For more details, please visit: renesas.com/ra8d1



renesas.com

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