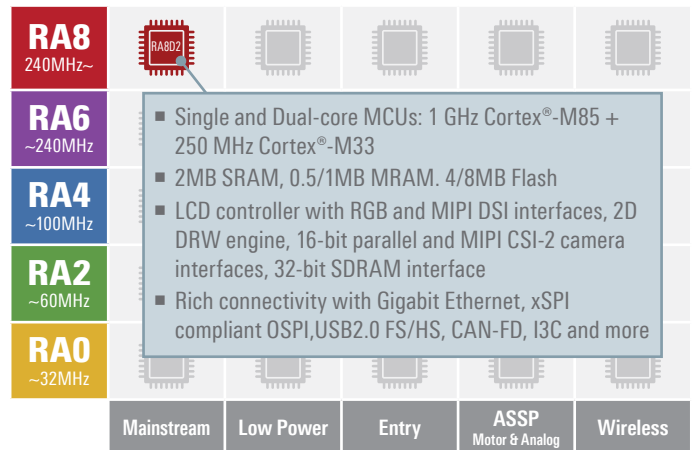


## 32-BIT MCU FAMILY

# RENESAS RA8D2 GROUP

### 1 GHz Arm® Cortex®-M85 and Cortex-M33 Dual-Core MCU with Advanced Graphics Capabilities

The Renesas RA8D2 group features high-performance 32-bit single and dual-core MCUs, delivering performance of over 7300 CoreMark to handle complex, real-time processing tasks. These graphics-enabled MCUs include large on-chip memory, multiple memory interfaces, and a rich set of graphics peripherals such as a high-resolution LCD controller with parallel RGB and MIPI DSI interfaces, 16-bit parallel CEU and MIPI CSI-2 camera interfaces to enable demanding graphics/HMI and Vision AI applications. The RA8D2 MCUs are available in 224, 289 and 303BGA packages. Advanced security is integrated with new cryptographic Security IP, immutable storage and tamper protection, enabling truly secure consumer and IoT applications.



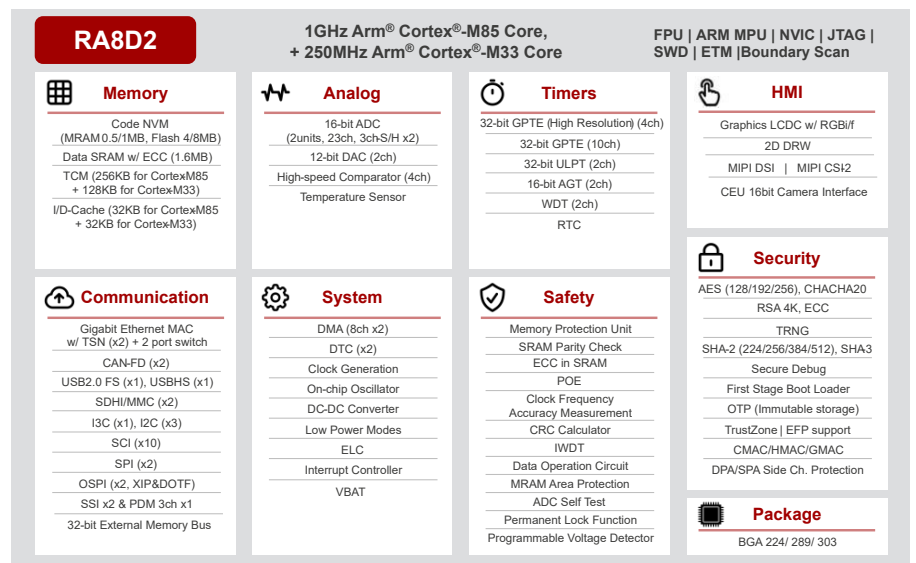
#### Key Features

- 1GHz Arm® Cortex®-M85 Core
- 250MHz Cortex-M33 Core
- 0.5/1MB MRAM and 4/8MB Flash
- 2MB SRAM including TCM; 64KB Caches
- Parallel and MIPI CSI-2 Camera Interfaces
- I2S and PDM Interfaces
- GLCDC w/ RGB & MIPI DSI I/Fs
- 2D Drawing Engine
- 224, 289, 303pin BGA Packages
- 32-bit High Resolution and Ultra-low Power Timers
- Renesas Security IP, TrustZone, Tamper Protection
- Secure Boot with Immutable Storage for First Stage Bootloader
- 16-bit ADC, 12-bit DAC, HS Comparators
- Gigabit Ethernet, TSN Switch, USB2.0 HS/FS, CAN-FD Interfaces
- SDHI, SPI, I3C/I2C Serial Interfaces
- 32bit External Memory I/F (CS/SDRAM)
- xSPI Compliant Octal SPI with XIP & DOTF

#### Target Applications

- Industrial HMI, Machine vision
- Video doorbells, Security cameras
- Thermostats, Security panels
- Printer displays, QR code reader
- Patient health monitor

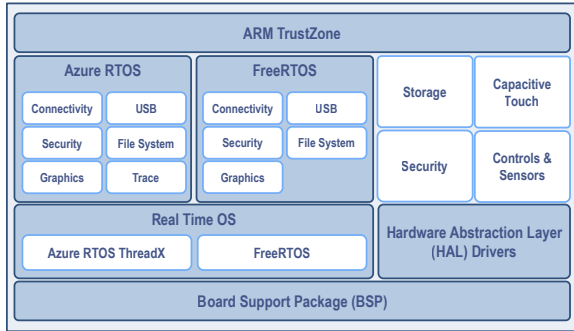
#### Block Diagram



# RENESAS RA8D2 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

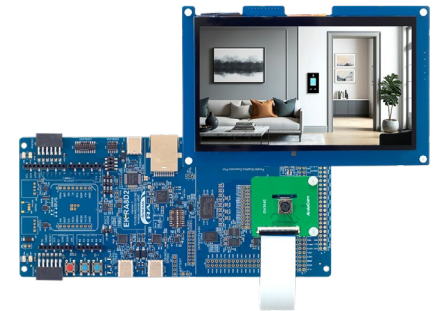
The e²studio IDE provides support with intuitive configurators and intelligent code generation to make programming and debugging easier and faster.

IDE	Renesas e²studio	Keil MDK	IAR EWARM
Compiler	<ul style="list-style-type: none"> <li>GCC</li> <li>LLVM</li> <li>Arm Compiler*</li> <li>IAR Arm Compiler*</li> </ul>	<ul style="list-style-type: none"> <li>Arm Compiler*</li> </ul>	<ul style="list-style-type: none"> <li>IAR Arm Compiler*</li> </ul>
Debug Probe	<ul style="list-style-type: none"> <li>Renesas E2/E2 Lite</li> <li>SEGGER J-Link</li> </ul>	<ul style="list-style-type: none"> <li>SEGGER J-Link</li> <li>Keil ULINK / CMSIS-DAP**</li> </ul>	<ul style="list-style-type: none"> <li>IAR I-jet</li> <li>SEGGER J-Link</li> <li>Renesas E2/E2 Lite</li> <li>CMSIS-DAP**</li> </ul>
Production Programmer	<ul style="list-style-type: none"> <li>Renesas PG-FP6</li> </ul>	<ul style="list-style-type: none"> <li>SEGGER J-Flash</li> </ul>	<ul style="list-style-type: none"> <li>Partner solutions</li> </ul>

\* Compiler must be purchased and licensed directly from third party  
\*\* limited support

## Evaluation Kit

- Evaluate key features of RA8D2 MCUs and develop advanced embedded applications, including edge and endpoint AI/ML, HMI, and other system designs
- Includes Parallel Graphics Expansion Board (7" capacitive touch TFT, 1024×600) and Camera Expansion Connector supporting both CEU and MIPI-CSI2
- On-board debugging using SEGGER-J-Link®
- Order the kit and download documentation, design package, development tools and software at: [www.renesas.com/ek-ra8d2](http://www.renesas.com/ek-ra8d2)
- Orderable part number: **RTK7EKA8D2S01001BE**



## Ordering References

Ext. Flash/ MRAM/RAM	EtherCAT	Tj	Max frequency	Ordering Reference	Ordering Reference	Ordering Reference	Ordering Reference	Ordering Reference
			Ordering Reference	Ordering Reference	Ordering Reference	Ordering Reference	Ordering Reference	Ordering Reference
Flash 8MB MRAM 1MB SRAM 2MB	Yes	0 to 95 °C	1GHz/250MHz					R7JA8D2KSLSAJ
		-40 to 105 °C	800MHz/200MHz					R7JA8D2KSDSAJ
	No	0 to 95 °C	1GHz/250MHz					R7JA8D2JLSAJ
		-40 to 105 °C	800MHz/200MHz					R7JA8D2JSDSAJ
Flash 4MB MRAM 1MB SRAM 2MB	Yes	0 to 95 °C	1GHz/250MHz					R7JA8D2KRLSAJ
		-40 to 105 °C	800MHz/200MHz					R7JA8D2KRDSAJ
	No	0 to 95 °C	1GHz/250MHz					R7JA8D2JRLSAJ
		-40 to 105 °C	800MHz/200MHz					R7JA8D2JRDSAJ
MRAM 1MB SRAM 2MB	Yes	0 to 95 °C	1GHz/250MHz	R7KA8D2BFLCAB	R7KA8D2BFLCAC	<b>R7KA8D2KFLCAB</b>	<b>R7KA8D2KFLCAC</b>	
		-40 to 105 °C	800MHz/200MHz	R7KA8D2BFDCAB	R7KA8D2BFDCAC	R7KA8D2KFDCAB	R7KA8D2KFDCAC	
	No	0 to 95 °C	1GHz/250MHz	R7KA8D2AFLCAB	R7KA8D2AFLCAC	R7KA8D2JFLCAB	R7KA8D2JFLCAC	
		-40 to 105 °C	800MHz/200MHz	R7KA8D2AFDCAB	R7KA8D2AFDCAC	R7KA8D2JFDCAB	R7KA8D2JFDCAC	
MRAM 512KB SRAM 2MB	Yes	0 to 95 °C	1GHz/-	R7KA8D2BDLCAB	R7KA8D2BDLCAC			
		-40 to 105 °C	800MHz/-	R7KA8D2BDDCAB	R7KA8D2BDDCAC			
	No	0 to 95 °C	1GHz/-	R7KA8D2ADLCAB	R7KA8D2ADLCAC			
		-40 to 105 °C	800MHz/-	R7KA8D2ADDCAB	R7KA8D2ADDCAC			
Pin Count				224-pin	289-pin	224-pin	289-pin	303-pin
Package type				BGA	BGA	BGA	BGA	BGA
Package size (body)				11 x 11 mm	12 x 12 mm	11 x 11 mm	12 x 12 mm	15 x 15 mm
Pin pitch				0.65 mm	0.65 mm	0.65 mm	0.65 mm	0.8 mm
Core				Single (Cortex-M85)		Dual (Cortex-M85/Cortex-M33)		

Coming Soon

For more details, please visit: [renesas.com/ra8d2](http://renesas.com/ra8d2)



### Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan  
[www.renesas.com](http://www.renesas.com)

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