

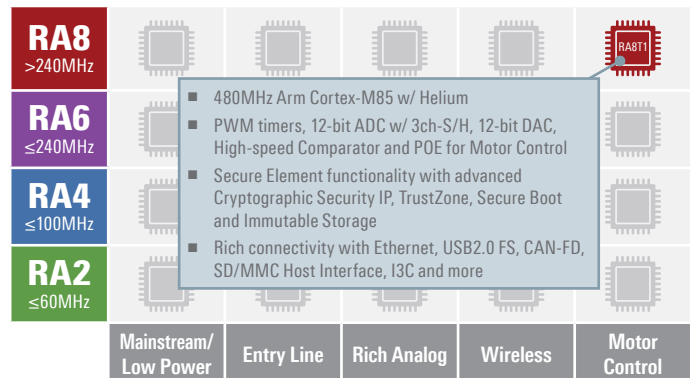


## 32-bit MCU Family

# RENESAS RA8T1 GROUP

### 480 MHz Arm® Cortex®-M85 Based Microcontroller with Helium™ and TrustZone® for Motor Control

The RA8T1 Group 32-bit MCUs are based on the 480 MHz Arm Cortex-M85 core with Helium Technology and TrustZone with peripheral features optimized for motor or inverter controls. RA8T1 integrates up to 2MB large Flash memory, 1MB SRAM including TCM, PWM timers, analog features, multiple connectivity features, and also supports advanced security features and safety functions. These MCUs enable advanced motor control or additional functions on end systems with high performance and abundant integrated features. The RA8T1 Group supports the Flexible Software Package (FSP) and ecosystem partner solutions, as well as motor control evaluation kits, software, and tools.



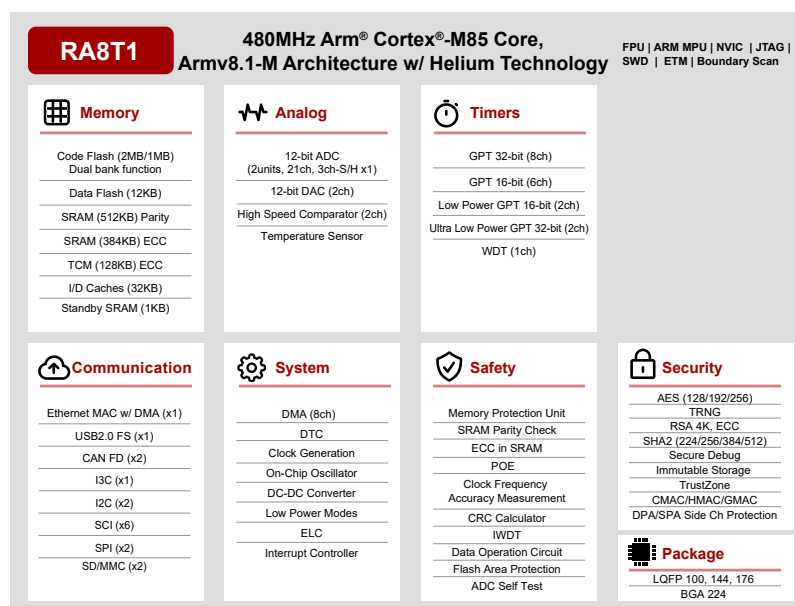
### Key Features

- 480 MHz Arm Cortex-M85 with Helium Technology
- 1MB - 2MB Dual-bank Flash memory
- 1MB SRAM including TCM
- 14ch PWM Timers and 4ch Low-Power Timers
- 12-bit A/D Converter with 3-ch Sample and Hold
- 12-bit D/A Converter and High-speed Analog Comparator
- Ethernet MAC with DMA Controller
- USB2.0 Full-Speed Device/Host
- CAN FD, SD/MMC Host Interface
- Renesas Secure IP (RSIP-E51A)
- Immutable ROM for First Stage Boot Loader (FSBL)
- Scalable from 100-pin to 224-pin packages

### Target Applications

- Industrial Automation (AC Drive, AC Servo, AGV/AMR)
- Building Automation (HVAC, Compressor, Solar Inverter)
- Smart Home (Air Conditioner, Washer/Dryer, Refrigerator, Vacuum Cleaner)
- Fields (Power Tools, Mower Machine)

### Block Diagram

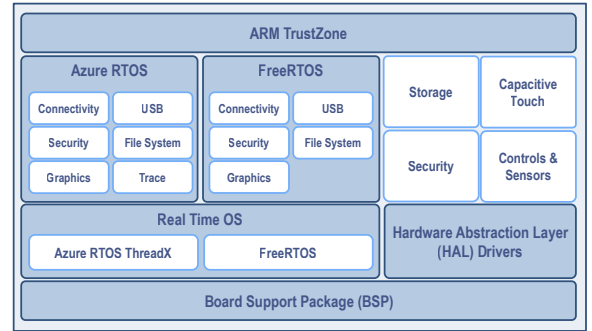


# RENESAS RA8T1 GROUP

## 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 e<sup>2</sup> studio IDE provides support with intuitive configurators and intelligent code generation to make programming and debugging easier and faster.

IDE	Renesas e <sup>2</sup> studio	Keil MDK	IAR EWARM
<b>Compiler</b>	<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>
<b>Debug Probe</b>	<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 (limited support)</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 (limited support)</li> </ul>
<b>Production Programmer</b>	<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

## Evaluation Kit

- MCK-RA8T1 Renesas Flexible Motor Control Kit for RA8T1 Group including CPU board, inverter board, communication board, PMSM motor and accessories
- MCB-RA8T1 individual CPU board for RA8T1 enables connection to existing MCK platform boards and evaluation with the single board
- On-board debugging using SEGGER J-Link®
- Order the kit and download documentation, design package, development tools, and software at: [renesas.com/mck-ra8t1](https://renesas.com/mck-ra8t1) or [renesas.com/mcb-ra8t1](https://renesas.com/mcb-ra8t1)
- Orderable part number:
  - RTK0EMA5K0S00020BJ (MCK-RA8T1)
  - RTK0EMA5K0C00000BJ (MCB-RA8T1)



## Ordering References

Flash/RAM	Tj				
2MB/1MB	-40 to 125 °C	<b>R7FA8T1AHECFP</b>	<b>R7FA8T1AHECFB</b>	<b>R7FA8T1AHECFC</b>	<b>R7FA8T1AHECBD</b>
1MB/1MB	-40 to 125 °C	<b>R7FA8T1AFECFP</b>	<b>R7FA8T1AFECFB</b>	<b>R7FA8T1AFECFC</b>	<b>R7FA8T1AFECBD</b>
Pin Count		100-pin	144-pin	176-pin	224-pin
Package		LQFP	LQFP	LQFP	BGA
Package size (body)		14 x 14 mm	20 x 20 mm	24 x 24 mm	13 x 13 mm
Pitch		0.5 mm	0.5 mm	0.5 mm	0.8 mm

For more details, please visit: [renesas.com/ra8t1](https://renesas.com/ra8t1)



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