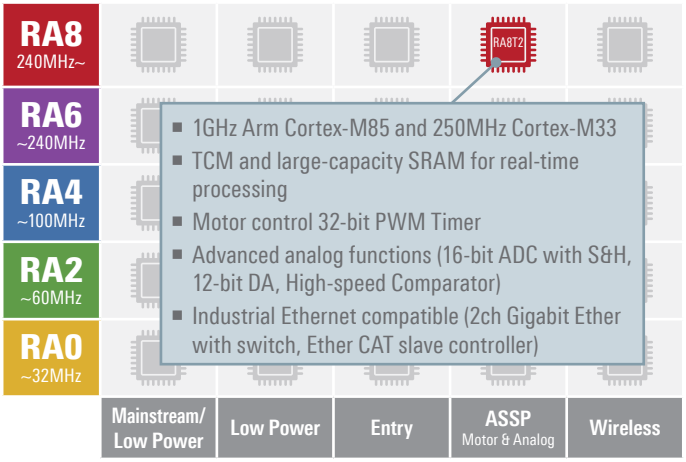
32-BIT MCU FAMILY

RENESAS RA8T2 GROUP

1GHz Arm® Cortex®-M85 ASSP MCU for Real-Time Control Applications

The RA8T2 is an ASSP MCU optimized for applications requiring high real-time performance, such as motor control. Developed with the advanced 22nm process, RA8T2 delivers 1GHz performance based on Arm Cortex-M85; and over 7,000 CoreMark to enable high-speed calculations required for high-end industrial motor equipment. The dual-core variant includes a 250MHz Cortex-M33 that efficiently separates real-time processing from other processing, enabling parallel operation. This capability makes RA8T2 ideal for applications handling complex system control in addition to motor control.



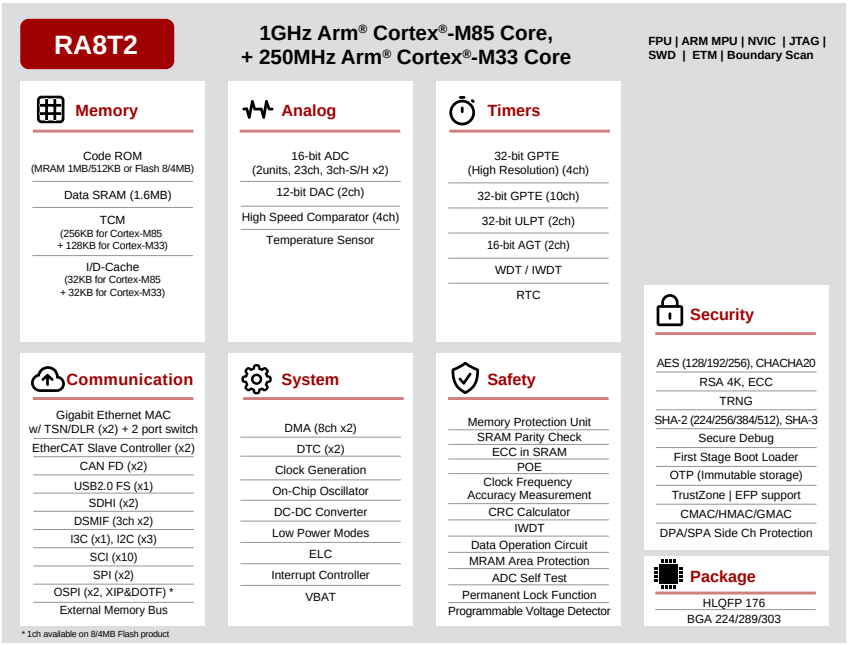
Key Features

- 1GHz Arm® Cortex®-M85 Core
- 250MHz Cortex-M33 Core
- Large Memory: 0.5/1MB MRAM & 4/8MB Flash
- 2MB SRAM (Including TCM 256KB+128KB)
- 224, 289, 303-pin BGA package
- 176-pin HLQFP package
- Renesas Security IP, TrustZone, Tamper protection
- 32-bit PWM timer, High Resolution timer
- 16-bit ADC, 12-bit DAC, High speed comparators
- Gigabit Ethernet, TSN Switch, USB2.0 FS, CAN-FD I/Fs
- EtheCAT slave controller
- SDHI, SPI, I3C/I2C Serial Interfaces

Target Applications

- AC Drive
- AC Servo
- Industrial Motor
- Robotics
- CNC

Block Diagram



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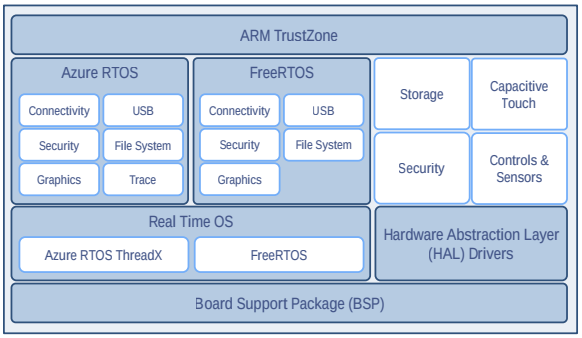
Software Package

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

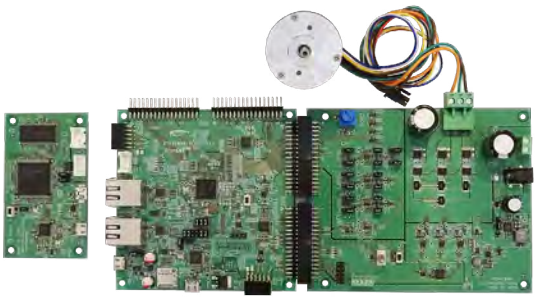
The e²studio IDE provides support with intuitive configurators and intelligent code generation to make programming and debugging easier and faster.

IDE	Renesas e²studio	Keil MDK	IAR EWARM
Compiler	■ 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**	■ IAR I-jet ■ SEGGER J-Link ■ Renesas E2/E2 Lite ■ CMSIS-DAP**
Production Programmer	■ Renesas PG-FP6 ■ SEGGER J-Flash ■ Partner solutions		

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

Evaluation Kit

Evaluate key features of the RA8T2 MCU group and develop applications with high real-time performance including motor control. This motor control kit includes a CPU board, inverter board, communication board, BLDC motor, and accessories such as EtherCAT slave I/F. Users can conduct on-board debugging using SEGGER-J-Link®. Get more information about the kit at renesas.com/mck-ra8t2



Ordering References

* Indicating max frequency as Cortex-M85/Cortex-M33

Coming Soon

Ext. Flash/ MRAM/RAM	EtherCAT	Tj	Max frequency*							
Flash 8MB MRAM 1MB SRAM 2MB	Yes	0 to 95 °C	1GHz/250MHz							R7KA8T2LSLSAJ
		-40 to 105 °C	800MHz/200MHz							R7KA8T2LSDSAJ
	No	0 to 95 °C	1GHz/250MHz							R7KA8T2JSLSAJ
		-40 to 105 °C	800MHz/200MHz							R7KA8T2JSDSAJ
Flash 4MB MRAM 1MB SRAM 2MB	Yes	0 to 95 °C	1GHz/250MHz							R7KA8T2LRLSAJ
		-40 to 105 °C	800MHz/200MHz							R7KA8T2LRDSAJ
	No	0 to 95 °C	1GHz/250MHz							R7KA8T2JRLSAJ
		-40 to 105 °C	800MHz/200MHz							R7KA8T2JRDSAJ
MRAM 1MB SRAM 2MB	Yes	0 to 95 °C	1GHz/250MHz		R7KA8T2CFLCAB	R7KA8T2CFLCAC		R7KA8T2LFLCAB	R7KA8T2LFLCAC	
		-40 to 105 °C	800MHz/200MHz		R7KA8T2CFDCAB	R7KA8T2CFDCAC		R7KA8T2LFDCAB	R7KA8T2LFDCAC	
		-40 to 125 °C	600MHz/200MHz	R7KA8T2CFECHC	R7KA8T2CFECAB	R7KA8T2CFECAC	R7KA8T2LFECHC	R7KA8T2LFECAB	R7KA8T2LFECAC	
	No	0 to 95 °C	1GHz/250MHz		R7KA8T2AFLCAB	R7KA8T2AFLCAC		R7KA8T2JFLCAB	R7KA8T2JFLCAC	
		-40 to 105 °C	800MHz/200MHz		R7KA8T2AFDCAB	R7KA8T2AFDCAC		R7KA8T2JFDCAB	R7KA8T2JFDCAC	
		-40 to 125 °C	600MHz/200MHz	R7KA8T2AFECHC	R7KA8T2AFECAB	R7KA8T2AFECAC	R7KA8T2JFECHC	R7KA8T2JFECAB	R7KA8T2JFECAC	
MRAM 512KB SRAM 2MB	Yes	0 to 95 °C	1GHz/-							
		-40 to 105 °C	800MHz/-		R7KA8T2CDDCAB					
		-40 to 125 °C	600MHz/-	R7KA8T2CDECHC	R7KA8T2CDECAB					
	No	0 to 95 °C	1GHz/-							
		-40 to 105 °C	800MHz/-		R7KA8T2ADDCAB					
		-40 to 125 °C	600MHz/-	R7KA8T2ADECHC	R7KA8T2ADECAC					
Pin Count				176pin	224-pin	289-pin	176pin	224-pin	289-pin	303-pin
Package type				HLQFP	BGA	BGA	HLQFP	BGA	BGA	BGA
Package size (body)				24 x 24mm	11 x 11 mm	12 x 12 mm	24 x 24mm	11 x 11 mm	12 x 12 mm	15 x 15 mm
Pin pitch				0.5 mm	0.65 mm	0.65 mm	0.5 mm	0.65 mm	0.65 mm	0.8 mm
Core				Single (Cortex-M85)			Dual (Cortex-M85/Cortex-M33)			

For more details, please visit: **renesas.com/ra8t2**

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