**News Release**

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**Renesas Brings Industry-Leading Performance of RA8 Series MCUs to Motor Control Applications**

*Motor Control Leader Debuts RA8T1 Group MCUs Based on Arm® Cortex®-M85 Processor to Deliver Low Power Operation and Specialized Analog Functions for Industrial, Building and Home Automation Applications*

**Düsseldorf, January 30, 2024 ―** Renesas Electronics Corporation (TSE:6723), a premier supplier of advanced semiconductor solutions, today introduced the RA8T1 microcontroller (MCU) group based on the Arm® Cortex®-M85 processor. RA8T1 devices address real-time control of motors, power supplies and other products commonly used in industrial and building automation, as well as smart homes.

The RA8T1 group is the third in Renesas’ RA8 Series, all of which deliver breakthrough performance of 6.39 CoreMark/MHz[[1]](#footnote-2). All RA8 MCUs take advantage of the high performance of the Arm Cortex-M85 processor and Arm’s Helium™ technology that provides up to a 4X performance boost for digital signal processor (DSP) and machine learning (ML) implementations over the Cortex-M7 core. This added performance in RA8T1 devices can be used for AI functions that can predict maintenance requirements for motors, reducing costly downtime.

**Feature Set Optimized for Motor Control**

The new [RA8T1](https://www.renesas.com/products/microcontrollers-microprocessors/ra-cortex-m-mcus/ra8t1-480-mhz-arm-cortex-m85-based-microcontroller-helium-and-trustzone?utm_campaign=f-up-mcu_ra8t1-epsg-iotbd-ipm1-null&utm_source=null&utm_medium=pr&utm_content=pp) devices include advanced PWM timing features such as 3-phase complementary output, 0% and 100% duty output capability, a double-buffer compare match register, and five phase counting modes. Analog capabilities of the new MCUs include 12-bit ADCs, 12-bit DACs and high-speed comparators used in voltage and current measurement and over-current protection. RA8T1 MCUs also offer multiple communications functions, including SCI, SPI, I2C/I3C, CAN/CAN-FD, Ethernet, and USB-FS. The new group also provides port output shutdown capability when an anomaly is detected, an important safety feature in motor control. These capabilities combined with the advanced timers and Renesas’ power management expertise, enable customers to build comprehensive, low-power motor control solutions.

**Renesas Leadership in Embedded Processing for Motor Control**

Renesas has shipped motor-control specific MCUs for over 10 years ago. The company ships over 230 million motor control embedded processors per year to thousands of customers worldwide. In addition to multiple RA MCU groups, Renesas offers motor-control specific devices in its 32-bit RX Family, its 16-bit RL78 MCUs and its 64-bit RZ MPUs. Renesas also introduced the industry’s first [RISC-V-based ASSP](https://www.renesas.com/products/microcontrollers-microprocessors/risc-v/r9a02g020-assp-easy-mcu-motor-control-based-risc-v?utm_campaign=f-up-mcu_ra8t1-epsg-iotbd-ipm1-null&utm_source=null&utm_medium=pr&utm_content=pp&other=riscv_motor) designed for motor control.

“Renesas is already the market leader in motor control with the widest MCU portfolio for smart home, building and factory automation systems,” said **Daryl Khoo, Vice President of the Embedded Processing 1st Division at Renesas**. “The performance of these MCUs is critical in high-speed electric motor control that requires sophisticated algorithms and application software to run in a reliable, safe and secure manner. The RA8T1 MCUs bring unprecedented CPU horsepower to the portfolio along with Helium technology that allows our customers the additional flexibility to deliver smart (AI/ML) solutions without the need for additional hardware.”

All RA8 devices also offer advanced security including Arm TrustZone® technology, Renesas Security IP (RSIP-E51A), Secure Boot with first stage bootloader in immutable storage, and Pointer Authentication and Branch Target Identification (PACBTI) security extension.

**Key Features of the RA8T1 Group MCUs**

* **Core**: 480 MHz Arm Cortex-M85 with Helium and TrustZone
* **Memory**: Integrated 2MB/1MB Dual-bank Flash memory and 1MB SRAM (including 128KB TCM, 512KB ECC protected)
* **Analog Peripherals:** Advanced 18-channel PWM timers, 12-bit ADC, 12-bit DAC, high-speed comparators
* **Communications Peripherals**: Ethernet MAC, USB-FS, CAN-FD, I2C/I3C, SPI, SD and MMC memory card interfaces
* **Advanced Security**: Leading-edge cryptographic algorithms, TrustZone, Secure Boot, immutable storage, tamper resistance with DPA/SPA attack protection, secure debug, secure factory programming and lifecycle management support
* **Packages**: 100-, 144- and 176-pin LQFPs, 224-pin BGA

The new RA8T1 Group MCUs are supported by Renesas’ [Flexible Software Package](https://www.renesas.com/software-tool/flexible-software-package-fsp?utm_campaign=f-up-mcu_ra8t1-epsg-iotbd-ipm1-null&utm_source=null&utm_medium=pr&utm_content=sw&other=fsp) (FSP). The FSP enables faster application development by providing all the infrastructure software needed, including multiple RTOS, BSP, peripheral drivers, middleware, connectivity, networking, and security stacks as well as reference software to build complex AI, motor control and cloud solutions. It allows customers to integrate their own legacy code and choice of RTOS with FSP, thus providing full flexibility in application development. Using the FSP will ease migration of existing designs to the new RA8 Series devices.

**Winning Combinations**

Renesas has combined the new RA8T1 Group MCUs with numerous compatible devices from its portfolio to offer a wide array of Winning Combinations, including the [20KW 3-Phase PFC Inverter](https://www.renesas.com/application/power-and-energy/energy-generation-distribution/20kw-3-phase-pfc-inverter?utm_campaign=f-up-mcu_ra8t1-epsg-iotbd-ipm1-null&utm_source=null&utm_medium=pr&utm_content=wc). Winning Combinations are technically vetted system architectures from mutually compatible devices that work together seamlessly to bring an optimized, low-risk design for faster time to market. Renesas offers more than 400 Winning Combinations with a wide range of products from the Renesas portfolio to enable customers to speed up the design process and bring their products to market more quickly. They can be found at [renesas.com/win](https://www.renesas.com/applications?utm_campaign=f-up-mcu_ra8t1-epsg-iotbd-ipm1-null&utm_source=null&utm_medium=pr&utm_content=acp&other=wc).

**Availability**

The RA8T1 Group MCUs are available now, along with the FSP software. The new MCUs are supported in Renesas’ Flexible Motor Control development kit that enables easy evaluation of motor control using permanent magnet synchronous motors (brushless DC motors), and the Renesas Motor Workbench development tool. This development kit offers a common design platform with numerous Renesas motor control MCUs from the RA and RX families, enabling migration of IP across numerous devices. Information on all these offerings is available at [renesas.com/RA8T1](https://www.renesas.com/products/microcontrollers-microprocessors/ra-cortex-m-mcus/ra8t1-480-mhz-arm-cortex-m85-based-microcontroller-helium-and-trustzone?utm_campaign=f-up-mcu_ra8t1-epsg-iotbd-ipm1-null&utm_source=null&utm_medium=pr&utm_content=pp). Samples and kits can be ordered either on the Renesas website or through distributors.

**Renesas MCU Leadership**

The world leader in MCUs, Renesas ships more than 3.5 billion units per year, with approximately 50% of shipments serving the automotive industry, and the remainder supporting industrial and Internet of Things applications as well as data center and communications infrastructure. Renesas has the broadest portfolio of 8-, 16- and 32-bit devices, delivering unmatched quality and efficiency with exceptional performance. As a trusted supplier, Renesas has decades of experience designing smart, secure MCUs, backed by a dual-source production model, the industry’s most advanced MCU process technology and a vast network of more than 250 ecosystem partners. For more information about Renesas MCUs, visit [www.renesas.com/MCUs](http://www.renesas.com/MCUs).

**About Renesas Electronics Corporation**

Renesas Electronics Corporation ([TSE: 6723](http://www.jpx.co.jp/english/)) empowers a safer, smarter and more sustainable future where technology helps make our lives easier. The leading [global](https://www.renesas.com/about/company/profile/global.html) provider of microcontrollers, Renesas combines our expertise in embedded processing, analog, power and connectivity to deliver complete semiconductor solutions. These Winning Combinations accelerate time to market for automotive, industrial, infrastructure and IoT applications, enabling billions of connected, intelligent devices that enhance the way people work and live. Learn more at [renesas.com](http://www.renesas.com/). Follow us on [LinkedIn](https://www.linkedin.com/company/renesas/), [Facebook](https://www.facebook.com/RenesasElectronics/), [X](https://twitter.com/renesasglobal), [YouTube](https://www.youtube.com/user/RenesasPresents) and [Instagram](https://www.instagram.com/renesas_global/)

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**Media contact for further information, text and graphics or to discuss feature article opportunities:**

Alexandra Janetzko / Martin Stummer

HBI Communication Helga Bailey GmbH(PR agency), Hermann-Weinhauser-Str. 73, 81673 Munich, Germany

Tel.: +49 89 99 38 87-32 / -34

Email: [alexandra\_janetzko@hbi.de](mailto:alexandra_janetzko@hbi.de) / [martin\_stummer@hbi.de](mailto:martin_stummer@hbi.de)

Web: [www.hbi.de](http://www.hbi.de/)

1. EEMBC’s CoreMark® benchmark measures performance of MCUs and CPUs used in embedded systems. [↑](#footnote-ref-2)