

Renesas Electronics expands 32-bit RX600 microcontroller family with digital power control series



Renesas Electronics expanded its [RX600](#) [1] microcontroller (MCU) family with the new 32-bit RX62G group. The MCUs are optimized for digital power control applications, including motor control with power factor correction (PFC), digital power supply, uninterrupted power supplies (UPS) and solar inverters.

Digital power control applications require a unique balance of high performance and high resolution while meeting stringent power consumption and cost criteria. Previously, to serve these digital power applications, engineers have used dedicated DSP or application specific devices that hit the power/performance balance, but are often more complex and costly to design in. Further, these devices provide less flexibility, a limited range of products to choose from, and require specific tools and software compared with a general purpose MCU.

The combination of advanced analog, processing power, high-resolution capability and integrated timer functions make the new RX62G MCUs ideal to implement high-accuracy digital control for inverters/converters, power management and digital power supply, such as power systems and general-purpose server power. By enabling complex algorithms and high-precision control at an affordable cost, the RX62G series enables higher efficiency in these types of power control applications, helping to reduce their carbon footprints.

“As a society, we are becoming more conscious of our energy footprint, and digital power control is one area that enables us to achieve a more optimal power/performance balance. However, achieving better power efficiency requires

smarter embedded design,” said Ritesh Tyagi, senior director, MCU Products, Renesas Electronics America, “The RX62G group, which is based on high performance 32 bit RX CPU core, comes with comprehensive support ecosystem and provides a robust MCU platform for digital power control applications. Featuring a high-resolution timer with 312.5 picosecond (ps) resolution, 100 MHz operating frequency to achieve 165 Dhrystone MIPS (DMIPS) performance, and built-in floating point unit (FPU) and DSP functionality, the RX62G group is the industry’s first group of general-purpose MCUs to provide this level of combined high-resolution capability and extreme performance MCU.

Key features

The new MCUs expand on the advanced analog and control features of the [RX62T](#) [2] and [RX63T](#) [3] devices, delivering more efficient power consumption and performance. The new MCUs are also pin-compatible with the RX62T series, and software compatible with other members of the RX600 family, which offers greater scalability options for embedded engineers working with changing design requirements or on a variety of applications.

The new MCUs operate at 100MHz delivering constant 1.65DMips/MHz to provide maximum power efficiency when operated at lower speeds and outstanding performance at higher speed. Integrated DSP instruction and FPU enable efficient implementation of complex algorithms and control loops. The single-precision FPU offloads the RX CPU and simplifies decimal-point calculations, boosting overall processing performance and simplifying firmware development. With an embedded flash that works at CPU speed with no wait state, the RX62G delivers a real-time performance 165DMips at 100MHz in a pure deterministic manner.

The new series also feature four high-resolution timers capable of generating PWM signals with 312.5ps resolution needed to control power bridges to deliver maximum efficiency and lower power losses. Similar to the RX62T MCUs, the RX62G devices feature two 12-bit A/D converter units and one 10-bit A/D converter unit that can capture analog input values from up to 20 channels at a minimum conversion time of 1 μ s. Each of the A/D units can be triggered by timer units and can sample three phases in parallel. The RX62G MCUs also integrate a new 16-bit general-purpose pulse-width-modulation timer (GPT), and MTU3 multifunction timer-pulse units specialized for motor control. With this combination, one RX62G MCU can control up to three 3-phase motors simultaneously.

A leading supplier of analog and power devices, Renesas leverages its strong signal chain expertise to bring customers total solutions, including advanced MCU technologies and a robust design ecosystem with proprietary and third-party development tools and middleware.

Development tools and ecosystem support

Since the rollout of the RX MCU family in 2009, Renesas Electronics has been steadily introducing new devices, features, tools and partnerships to expand the capabilities of the MCUs. Renesas Electronics supports the [RX600](#) [1] MCUs with a

comprehensive hardware/software tool set from the company and third parties. Renesas Electronics offers the popular High-Performance Embedded Workshop (HEW) integrated development environment (IDE), which includes the RX-optimizing C/C++ compiler with integrated support for the low-cost E1 JTAG on-chip debugging tool, as well as the comprehensive E20 high-speed trace on-chip debugging tool.

The HEW IDE and Renesas Electronics' C/C++ compiler come with unlimited use for 60 days, and then the compiler size is limited to 128 KB thereafter. Third-party support for RTOS, middleware, and communication protocol stacks is available from the global community of Renesas Electronics' partner vendors.

Pricing and availability

Samples of the RX62G MCU are available now, with prices starting at US\$3.95 each in 10,000 unit quantities. Mass production is scheduled to begin in summer 2012 and is expected to reach a volume of 25M units per month in April 2013. The RX62G MCU will be available in two memory configurations - 256KB flash/16KB SRAM/ 32KB data flash and 128KB flash/8KB SRAM/8KB data flash, and 2 package variations - LQFP100 14x14 and LQFP112 20x20. The RX62G MCU is also available with or without CAN channels. (Pricing and availability are subject to change without notice.)

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<http://www.ecnmag.com/products/2012/03/renesas-electronics-expands-32-bit-rx600-microcontroller-family-digital-power-control-series>

Links:

[1] <http://www.rxmcu.com/USA/Rx600series.html>

[2] <http://am.renesas.com/products/mpumcu/rx/rx600/rx62t/index.jsp>

[3] <http://am.renesas.com/products/mpumcu/rx/rx600/rx63t/index.jsp>