

RX MICROCONTROLLER FAMILY

The Core Difference in Your Design

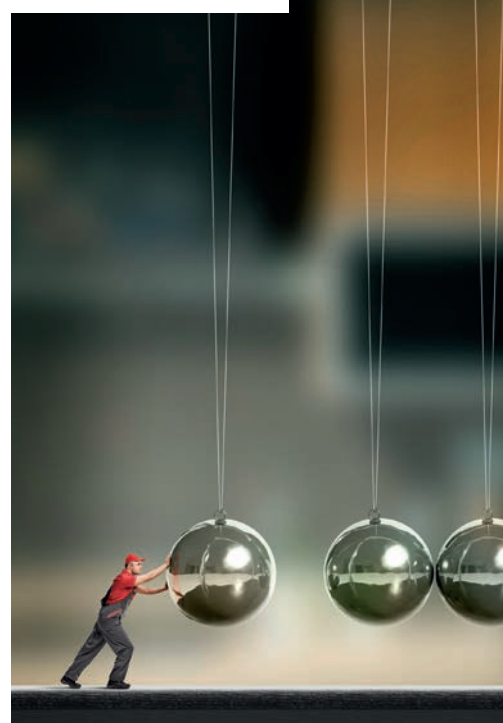


BIG IDEAS
FOR EVERY SPACE

32-BIT RX MCU FAMILY

COUNTLESS OPTIONS FOR YOUR DESIGN

Highest Performance on Class, broad Connectivity and largest Memory in the Market



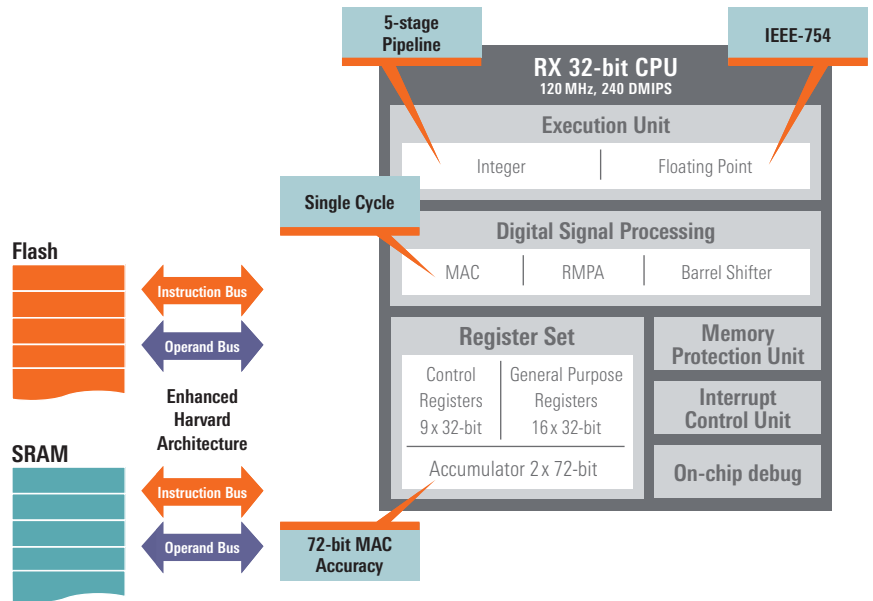
CONTENT

RX – The Core Difference	03
RX – 32-bit MCU family	03
RX – One Core, Countless Options	04
RX – A Solution for every Application	05
RX – Eco-System	07

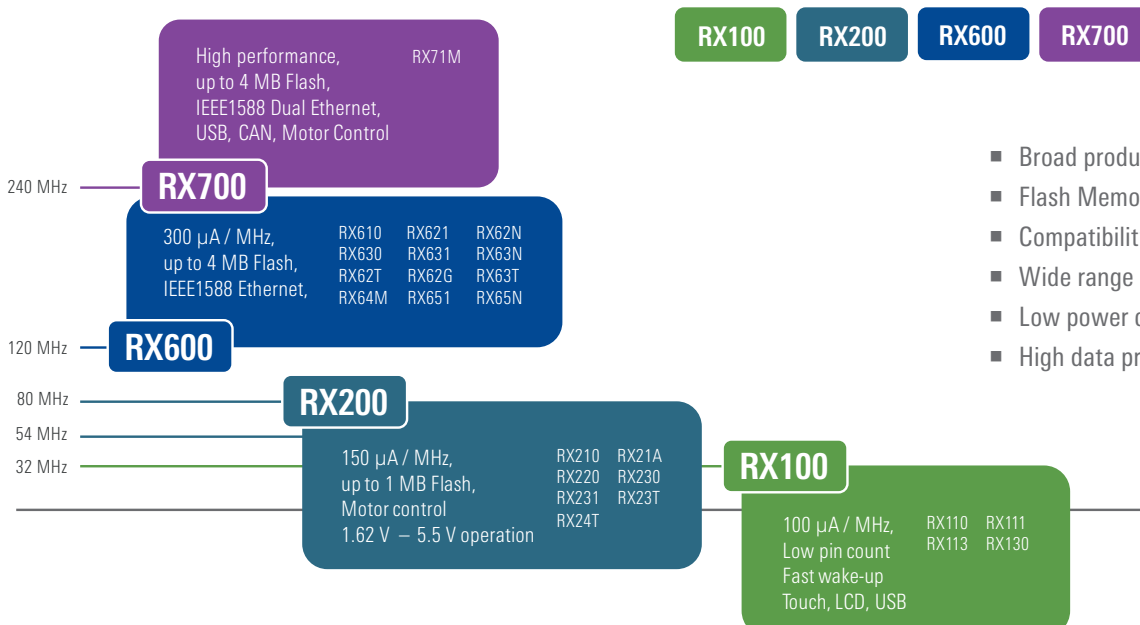
RX – THE CORE DIFFERENCE

RX family of 32-bit high performance microcontrollers provide the core difference in your design. With more than 2.0 DMIPS/MHz performance and Renesas' advanced single cycle MONOS flash technology, capable of operating at speeds up to 120 MHz with no wait states, the RX family brings with 240 MHz CPU frequency new levels of processing power to your application.

The 32-bit RX CPU core at the heart of every RX Microcontroller is designed to provide both the highest levels of CPU performance as well as compact and efficient code. Each core has a number of execution units both for integer arithmetic as well as a variety of DSP functions, supported by features such as Multiplieraccumulator and a barrel shifter. The RXv2 CPU core implemented on the latest RX200, RX600 and RX700 Series also comes with the additional on chip Floating Point Unit (FPU). The Core itself supports an Enhanced Harvard architecture with multiple data and instruction busses as well as a number of dedicated peripheral busses to maximise data throughput and peripheral performance. These together make the RX the highest performance and most efficient CPU core in its class, outperforming all of its competitors.



RX – 32-BIT MCU FAMILY



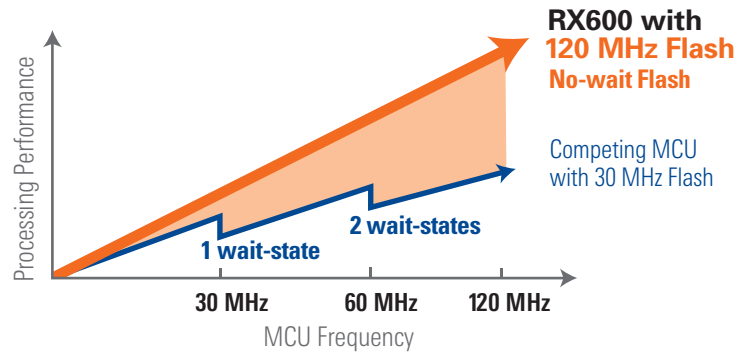
- Broad product line-up
- Flash Memory from 8 kB to 4 MB
- Compatibility
- Wide range of application coverage
- Low power consumption
- High data processing performance

RX – ONE CORE, COUNTLESS OPTIONS

Industry's only 120 MHz on-chip Flash

Each member of the RX family is implemented on an optimised flash process for a particular range of applications, while using the same standard RX CPU core and common peripherals, allowing easy software reuse across the whole family.

From the advanced RX700 family aimed at high performance applications to the low power/low pin count RX100 the huge range of highly integrated microcontrollers in the RX family provides the ideal solution for your application. Renesas' MONOS Flash technology allows the RX the ability to execute software without wait states to the maximum speed of the device, currently up to 120 MHz operating, leaving all other competing flash technologies behind MONOS flash technology. The combination of the powerful RX core and the high performance of the MONOS flash technology provide an unbeatable combination.



RX700 240 MHz Coremark / MHz > 4.35	Highest performance, connectivity and largest memory in the market	- Highest memory integration: 4 MB Flash, 512 k SRAM - Strong encryption: AES, DES, SHA, TRNG - Full connectivity: Dual Ethernet, USD HS and FS, CAN - Unique peripherals: DOC, ELC, MPC, CRC, CAC
RX600 120 MHz Coremark / MHz > 4.55	Advanced performance, connectivity and largest memory in the market	- Highest memory integration: 4 MB Flash, 512 k SRAM 0-Wait state Flash: Up to 120 MHz Flash operation - Full connectivity: Dual Ethernet, Dual USB, 3 x CAN - Unique peripherals: DOC, ELC, MPC, CRC, CAC
RX200 54 MHz – 80 MHz Coremark / MHz > 4.55	Low power high performance	- Low Power: 0.21 mA / DMIPS, 1.62 – 5.5V 0-Wait state Flash: Up to 80 MHz Flash operation - High integration-lower BOM: 12-bit ADC, 24-bit $\Sigma\Delta$ ADC - Unique peripherals: DOC, ELC, MPC, CRC, CAC
RX100 32 MHz Coremark / MHz 3.08	Low power entry level	- High reliability touch - Low Power: 100 μA / MHz, 350 nA Standby - Connectivity: USB, LIN - High integration for lower BOM: 12-bit ADC

RX – A SOLUTION FOR EVERY APPLICATION

The RX family provides a wide variety of solutions for many different applications, every device includes a range of powerful peripherals including motor control timers, up to 15 serial interfaces, powerful ADC's and advanced on-chip safety features.

The RX600/RX700 connectivity devices provide solutions for devices requirement features such as CAN, USB and Ethernet. Especially latest design like the RX65N and RX651 pushes the limits further in regards to integration and power efficiency. The RX62T & RX63T families provide true single chip cost effective, solutions for many motor control and inverter applications. For motor control applications where cost is one of the essential requirements the high integrated RX23T and RX24T serves the growing demand for efficient motor control. The

low power RX21A with an on-chip high resolution 24-bit ADC provides an ideal solution both for power meters and for a range of other applications where the accurate measurement of analogue signals is required. The new RX230 / RX231 product series offer a good mix of widely used peripherals and flash memory sizes, making it perfect fit for any general purpose requirement. The RX111 / RX110 / RX113 provides the entry level 32-bit performance devices in small packages with LCD, USB and lowest power consumption not only in active, but also in RTC mode. The RX family is available in a wide range of package and memory sizes, from 8 kbytes to 4 Mbytes of on-chip flash and a wide variety of LQFP, LGA and BGA package options, from space-saving 36-pin packages to 177-pin packages.

	RX100	RX200	RX600	RX700
Features	LOW POWER ENTRY LEVEL 1.8 – 3.6 V 32 MHz 3.08 Coremark / MHz	LOW POWER PERFORMANCE 1.62 – 5.5 V 54 MHz - 80 MHz 3.08 Coremark / MHz	CONNECTIVITY PERFORMANCE 120 MHz 4.55 Coremark / MHz	HIGHEST PERFORMANCE CONNECTIVITY 240 MHz 4.35 Coremark / MHz
HMI			RX62N / RX621 RX63N / RX631 RX64M RX651 / RX65N	RX71M
Motor Control Inverter	RX111	RX23T RX24T RX220	RX62T RX62G RX63T	RX71M
Analogue Metering	RX113	RX21A		
Connectivity		RX231	RX62N / RX621 RX63N / RX631 RX64M RX651 / RX65N	RX71M
Consumer	RX111 RX113 RX130	RX220		
General Purpose	RX110 RX111	RX231 RX210	RX610 RX630 RX651	RX71M

RX – ECO-SYSTEM

Renesas Starter Kit – RSK

The starter kit includes everything that the customer needs to evaluate and develop with the RX microcontroller:

- CPU board with target microcontroller
- LCD panel for user/diagnostic interaction
- E1 or E2-lite JTAG On Chip Debugger
- Trial Renesas C compiler and IDE (60 days unlimited then 128 k limited)
- Tutorial session
- Renesas e2studio development environment
- Sample peripheral driver code



Processor	RSK Part Number
RX610	R0K556100S000BE
RX62N	R0K5562N0S000BE
RX62T	R0K5562T0S000BE
RX630	R0K505630S000BE
RX63N	R0K50563NS000BE
RX63T	R0K50563TS000BE
RX210	R0K505210S000BE
RX220	R0K505220S000BE
RX63T-H	R0K5563THS000BE
RX62G	R0K50562GS000BE
RX64M	YR0K50564MS000BE
RX111	YR0K505111S000BE
RX71M	YR0K50571MS000BE
RX113	YR0K505113S000BE
RX65N RSK	YRTK500565NS00000BE
RX130	YRTK5005130S00000BE
RX231	YR0K505231S000BE

Application Development Tools

RX MCUs are supported by a comprehensive set of popular Renesas hardware and software tools that have been widely praised for their capabilities and ease of use. Additional support is provided by a dedicated community of third-party experts offering many helpful, time-saving products and services, including the development of optimised GNU compilers and IAR.



IAR Embedded Workbench, with full C and C++ support, MISRA C compliance checker
www.iar.com/ewrx



Can be fully integrated into Renesas e2studio IDE
www.gcc-renesas.com

Debugging, Emulation and Programming

On-chip debugging of an RX-based application is performed via JTAG and/or FINE (Single wire Interface) connection to the target and USB connection to the Windows-based IDE. E1, E2-Lite and J-Link offer thorough CPU control and visibility. E20 adds high-speed tracing.



Renesas E2 Emulator Lite
RTE0T0002LKCE00000R

Renesas E1
R0E000010KCE00

Renesas E20
R0E000200KCT00

SEGGER
J-Link

RX Solution Kits

Renesas provide a wide range of solution kits for the RX microcontrollers, this includes:

- TFT Control Solutions
- Motor Control Solutions
- Metering Solution
- DPS Solution
- Webserver Solution
- and several more ...



Before purchasing or using any Renesas Electronics products listed herein, please refer to the latest product manual and/or data sheet in advance.

Renesas Electronics Europe

www.renesas.com



© 2016 Renesas Electronics Europe.
All rights reserved. Printed in Germany.
Document No. R01CL0030ED0500