

RX100 MICROCONTROLLERS

Low power with 32-bit performance



BIG IDEAS
FOR EVERY SPACE

RX100 MCUs FOR TRUE LOW POWER™, LOW-COST, HIGH-PERFORMANCE APPLICATIONS

The Renesas RX100 Series encompasses the RX Family's entry-level 32-bit MCUs, extending the advanced RX architecture to the lowest possible power and cost points. This series is a great fit for those who need a balance of the widest set of peripherals, highest performance, and optimal system cost. The RX100 Series delivers the market's first 32-bit MCUs to feature True Low Power and cutting-edge peripherals like capacitive touch and LCD drive capability, as well as fast wake-up, zero wait-state flash, DSP capabilities, and multiple safety functions. The RX100 Series is comprised of the only entry-level 32-bit MCUs that offer integrated USB 2.0 host, device, and OTG support.

Designed to support a broad range of applications, the RX100 Series provides a combination of ultra-low power consumption, on-chip connectivity, an extensive DSP library, and superior performance at an attractive price ideally suited for 32-bit embedded applications. It consumes only 350 nA in sleep mode and snaps into full operation in just 4.8 µs. Flash memory size ranges from 8 KB to 512 KB and compact, low pin-count packages are available ranging from 36 to 100 pins.

Home Appliances

- Air Conditioning
- Refrigerators
- Washing Machines

Environmental Sensors

- Smoke
- Motion
- Humidity
- Light
- Wired & Wireless

Building Automation

- Thermostats
- Home Alarms
- Control Panels

Portable Medical

- Glucose Meters
- Blood-pressure Monitors
- Fitness Monitors
- Wearable Sensors

Industrial/Commercial

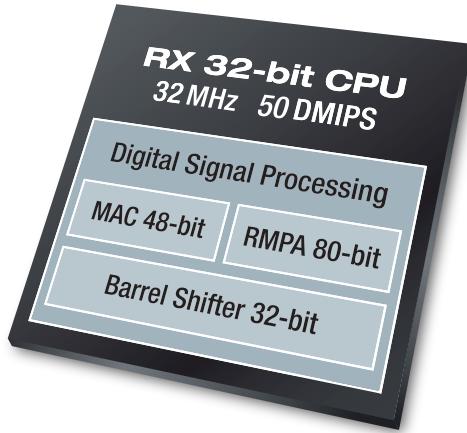
- Keyless Entry Controls
- Irrigation Systems
- Asset-tracking Equipment
- POS Terminals

Portable Electronics

- Remote Controls
- Meters/Measuring Instruments
- Games and Toys
- MP3 Players



Memory
Zero wait-state Flash up to 512 KB
SRAM up to 64 KB
Data Flash 8 KB



System	Communication	Timers
Event Link Controller	I ² C 9 ch	MTU2 16-bit 6 ch
Multifunction Pin Controller	SCI/UART 8 ch	TMR 8-bit 2 ch
Data Mgmt. DTC/DMA	SPI 9 ch	CMT 16-bit 2 ch
Interrupt Cont. 16 levels	USB 2.0 Host/Device/OTG	I-WDT
Clocks OSC PLL IRC	GPIO	RTC Calendar
POR/LVD	IrDA I ² S	
Safety CAC DOC CRC		
User Interface	Cap Touch	LCD Control

Low Power, Fast Wake-up

- 100 μ A/MHz*
- 350 nA standby, 4.8 μ s Wake-up
- Safety Features

High Performance

- 3.08 CoreMark®/MHz
- 1.56 DMIPS/MHz
- 50 DMIPS @ 32MHz

Advanced Peripherals

- USB 2.0
- Motor Control Timer
- LCD Controller
- Capacitive Touch

DSP Ready

- Hardware-based Divide
- Single-cycle Multiply
- 32-bit Barrel Shifter
- Extensive DSP Library

Zero wait-state Flash

- 1 KB Block Size
- Erase/Write Operation down to 1.8V
- BGO Data Flash (programmable while code is executed)

Safety

- Built-in Safety Features (CAC, DOC, I-WDT, GPIO)
- Temperature Sensor

Scalable

- Fully Compatible with RX600 and RX200
- Low Pin Count (36-100 pins), 8 KB to 512 KB
- Multifunction Pin Controller (MPC)



Please note: Refer to product selector guide in this brochure for specific device information.

** All peripherals OFF, running NOP.*

COMPUTING CAPABILITIES FOR APPLICATION PERFORMANCE

CoreMark per MHz

The RX100 core features 1.56 DMIPS/MHz and 3.08 CoreMark/MHz performance and achieves 50 DMIPS at 32 MHz.

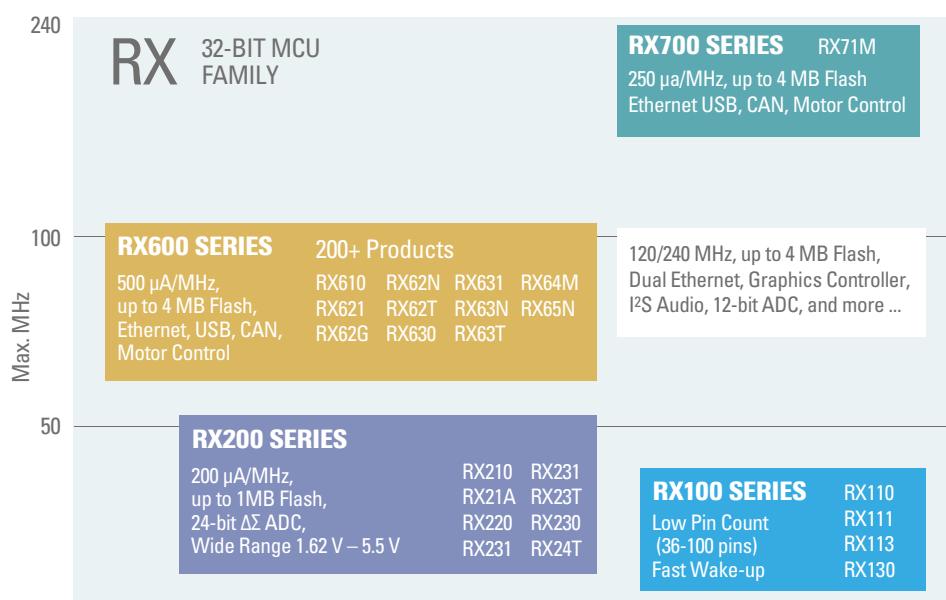


Sources: Cortex®-M Series CoreMark available on www.arm.com. RX200 and RX100 CoreMark estimates are from Renesas with IAR compiler. RX600 CoreMark are published on www.coremark.org.

RX FAMILY PERFORMANCE AND POWER ADVANTAGES

The RX Family contains three series of 32-bit MCUs that are optimized for a vast range of application requirements. The RX100, RX200, and RX600 Series are CPU and peripheral compatible and share the same software tools and ecosystem.

MCUs in the top-level RX600 Series are ideal for systems that require high-performance, excellent connectivity, LCD drive, and motor control capability. By contrast, devices in the RX200 and RX100 Series are optimized for ultra-low power, portable applications, safety functionality, and integrated analog interfaces.



RX100 – TRUE LOW POWER WITHOUT COMPROMISING PERFORMANCE

RX100 MCUs are great design choices for embedded systems that must minimize power consumption by running in sleep mode whenever possible, yet must wake-up quickly whenever there is a need to perform computing or control tasks. Renesas' True Low Power capability offers designers the lowest possible power consumption across the entire temperature and voltage range, including all peripherals and Flash memory, while also providing maximum flexibility with multiple operational and sleep modes. Four different power-saving modes are available: Run, Sleep, Deep Sleep, and Software Standby. Wake-up time in low-power mode ranges from less than 1 μ s to 4.8 μ s.

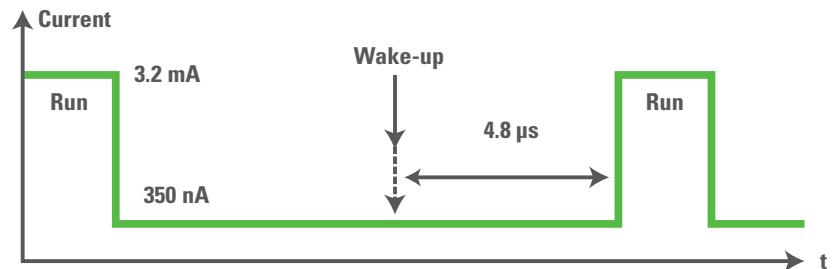
Peripherals that aren't required can be completely shut down in every mode. A flexible clock system allows peripherals to use a clock frequency from the one driving the CPU to achieve the lowest possible level of power consumption.

In run modes, the RX100 MCUs' three different operating modes can be applied according to the demands of the application at any point in time: high speed, middle speed and low speed.

Low Power Consumption, Fast Wake-up

Software standby achieves a power consumption of only 350 nA, with a 4.8 μ s wake-up time. Applications requiring a shorter wake-up can utilize the Sleep and Deep-Sleep modes that reduce the delay to just 1 μ s.

Run Mode	ICLK Frequency	Internal Voltage Regulator Mode
High Speed	8 MHz - 32 MHz	High Power
Middle Speed	1 MHz - 8 MHz	Middle Power
Low Speed	32 kHz - 1 MHz	Low Power



RX100 SERIES SAFETY FEATURES

RX100 MCUs provide six modular hardware subsystems that help products meet safety standards. Clock Accuracy Control checks that the clock frequency is within a predefined range. Oscillation Stop Detection switches the chip's main clock to an alternative source if the primary one fails. Data Operation Circuit continuously performs a SRAM failure test independent of the CPU. The Independent Watchdog Timer (I-WDT) uses a reliable internal clock source.

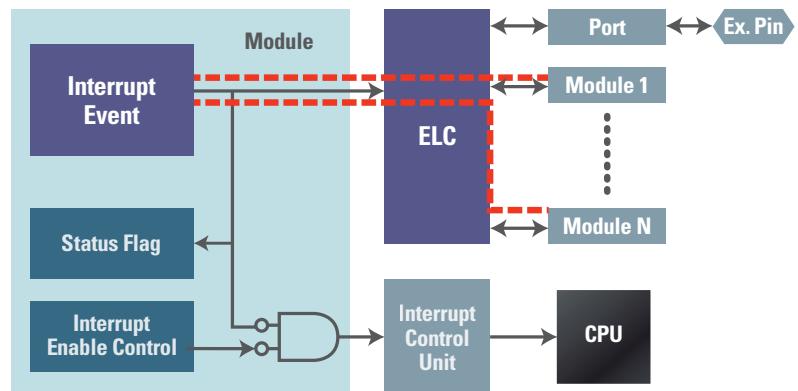
Clock	RAM	Serial Communication	OCO Dedicated for WDT
CAC Detects abnormal frequency	Data Operation Circuit Assists RAM failure check test	Cyclic Redundancy Check Detects serial communication data error	I-WDT Independent watchdog timer clock source from system clock
Oscillation Stop Detection Detects OSC stop Switch clock source to OCO			GPIO With read back ability

CAC: Clock frequency accuracy measurement circuit OCO: On-chip oscillator

FEATURES ENABLING LOW POWER CONSUMPTION AND DESIGN FLEXIBILITY

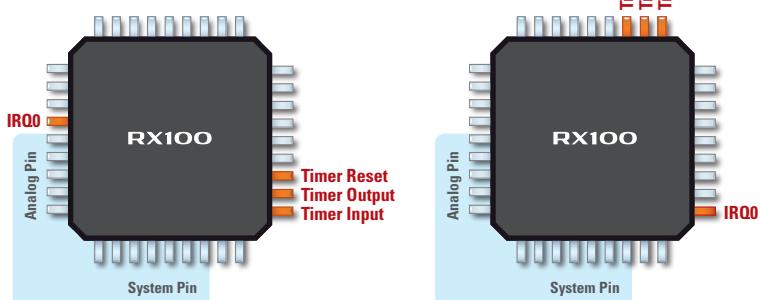
Event Link Controller

The Event Link Controller (ELC) is an innovative way to reduce CPU load by directly routing interrupt event signals from one peripheral or module to the other. As a result, power consumption, interrupt latency and program size are minimized.



Multifunction Pin Controller

The Multifunction Pin Controller (MPC) allows peripheral input and output signals to be remapped to alternate ports, offering more design layout flexibility. In this example, the ports of the IRQ0 and timer have been moved to a different location of the MCU.

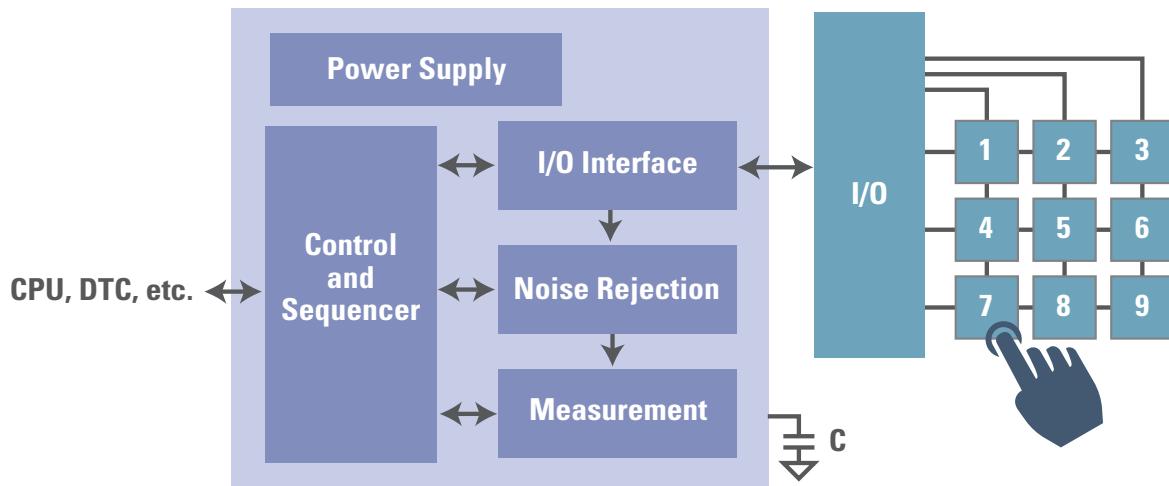


CAPACITIVE TOUCH SENSING UNIT (CTSU)

The Renesas RX113 and RX130 Series of microcontrollers incorporate a patented hardware peripheral block designed to measure small variations in electrical capacitance independent of the main CPU operation. The CTSU can be configured for self- or mutual-capacitance detection for maximum flexibility. This feature has been optimized to detect the presence of human touch typically used in many interface applications.



CTSU Block Diagram



Key Features and Benefits

- Hardware-assisted rejection of electrical noise and adaptation to environmental changes
- Touch detection through 10 mm of acrylic in user interface panels
- Automatic tuning mechanism for optimal touch performance
- Autonomous operation to enable ultra-low power touch detection for portable devices
- 48-, 64-, and 80-pin package options supporting up to 36 touch channels
- PC-based GUI tool for system configuration and development

Capacitive Touch Evaluation System for RX130

- CPU board
- USB cable
- Evaluation software
- Quick-start guide



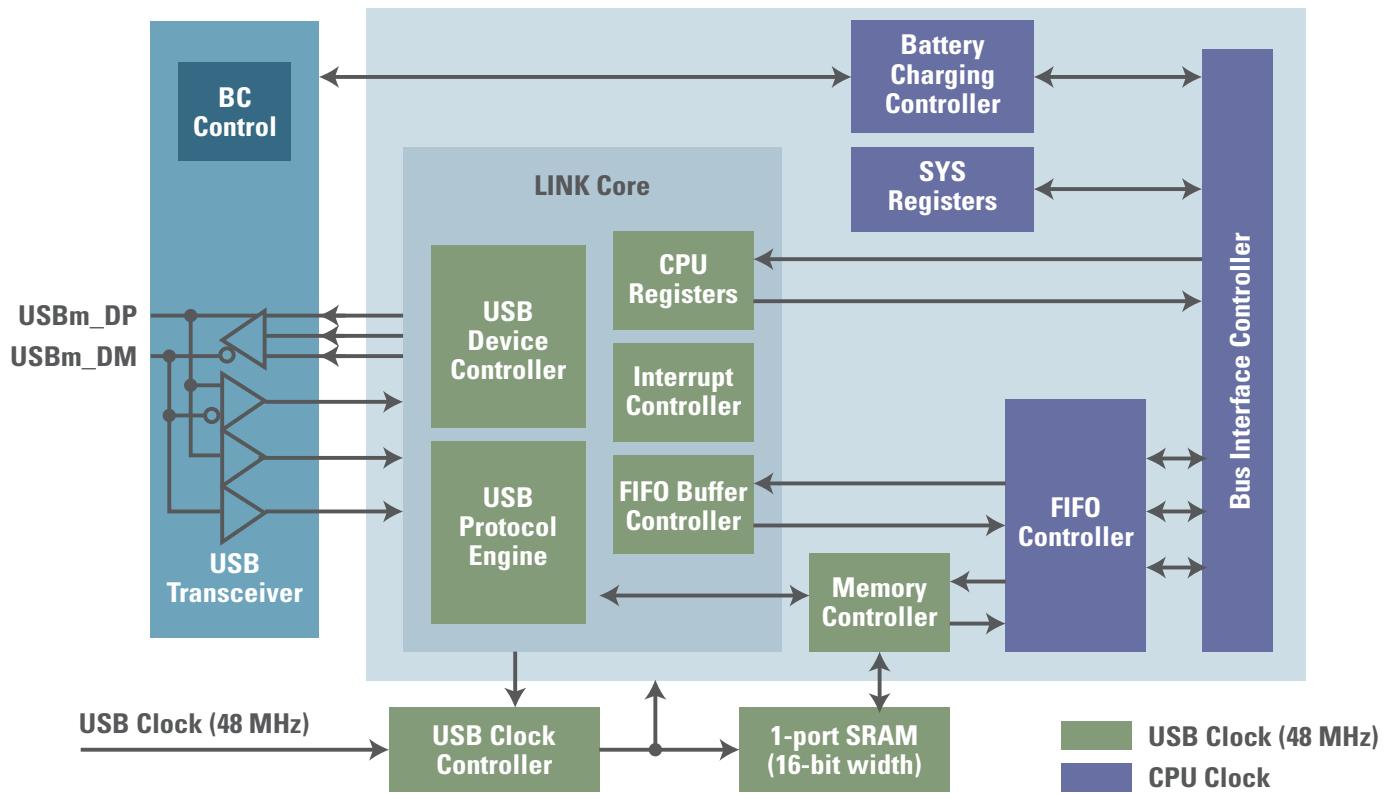
RX130 Capacitive Touch
Renesas Solution Starter Kit

P/N: RTK0EG0003S02001BJ

www.renesas.com/RX130CAPT01

USB CONNECTIVITY OF RX100 MCUs

Devices in the RX100 Series incorporate a USB 2.0 Host/Function controller and an OTG communication peripheral. Operating as a host, the controller provides full-speed and low-speed data transfers. It also supports battery charging and complies with the battery charging application specification, rev 1.2. (Not available on RX110 Group).



LCD DRIVE SUPPORT

Need LCD support for your design? The RX113 Group's advanced peripheral set offers the latest in LCD Drive and Control capability. Designed for maximum flexibility, the RX113 provides user-selectable liquid crystal waveform, while the LCD Driver voltage reference can easily switch between capacitor split method, external resistance method, or internal voltage boosting method. This allows users to maximize drive capability, operating current or drive voltage depending on application requirements.



RX113	0.85 μA
Company A	4.50 μA
Company B	5.60 μA
Company C	7.10 μA

- Supports capacitor split method, internal voltage boost method, and resistance division method
- Supports waveform types A and B
- Supports LCD contrast adjustment
- Supports LCD blinking
- Complies with USB Battery Charging Specification 1.2

ACCELERATE YOUR DESIGN WITH RX100 DSP CAPABILITIES

The Renesas RX100 MCU Series provides a clear advantage over competitive solutions by delivering critical DSP functionality not found in other entry-level 32-bit MCUs. Unlike competitive M0/M0+ families, the RX CPU core provides a hardware-based divide capability – offering a huge improvement in design efficiency and performance compared to software-based implementations. The RX CPU core also contains important DSP-enabling features like a 5-stage pipeline and 32-bit barrel shifter – capabilities not available in M0/M0+ solutions. Renesas makes it easy to develop your DSP application code by providing an extensive, scalable DSP instruction set that has been designed to maximize the superior performance of the RX CPU core. The state-of-the art DSP capabilities offered in the RX100 Series make it the obvious choice for low-cost, low-power signal processing applications.

Capability	RX111	M0/M0+
Multiply 32x32	1 Cycle	Small – 32 Cycles Fast – 1 Cycle
Hardware Divide	18 Cycles	–
ROM-based or Software Divide	–	97-700 Cycles
DSP Library	RX Library	CMSIS ¹

1: Supplied by ARM®

RX DSP LIBRARY – 36 KERNELS INCLUDE 308 FUNCTIONS



If your system needs digital-signal-processing (DSP) capabilities to handle applications such as intelligent sensing, imaging, communications, and audio, take advantage of the Renesas RX DSP Library. It contains 36 kernels and 308 functions that support filter, transform, complex, statistical, and matrix operations. Download all the DSP code you need.

Filter	
128 Functions	
Kernel	Generic Real FIR
	IIR Biquad
	Leaky LMS Adaptive
	Generic Complex FIR
	Lattice FIR
	Lattice IIR
	Single-Pole IIR

Complex	
47 Functions	
Kernel	Magnitude
	Phase
	Complex Add
	Complex Subtract
	Complex Multiply
	Complex Conjugate
	Magnitude Squared
	Fast Magnitude Estimate

Transform	
48 Functions	
Kernel	Forward Complex FFT
	Forward Complex DFT
	Inverse Complex FFT
	Inverse Complex DFT
	Forward Real FFT
	Forward Real DFT
	Inverse Complex Conjugate Symmetric FFT
	Inverse Complex Conjugate Symmetric DFT

Statistical	
45 Functions	
Kernel	Mean
	Max/Min
	Mean Absolute Value
	Variance
	Histogram
	Max Absolute Value
	Mean Absolute Deviation
	Median

Matrix	
40 Functions	
Kernel	Matrix Add
	Matrix Subtract
	Matrix Multiply
	Matrix Transpose
	Matrix Scale

FIT – FIRMWARE INTEGRATION TECHNOLOGY

FIT is a global set of Renesas standards enabling creation of high-quality, easy-to-use, interoperable firmware that addresses customer needs. FIT is a set of rules and guidelines to help produce better code and better projects – faster and easier.

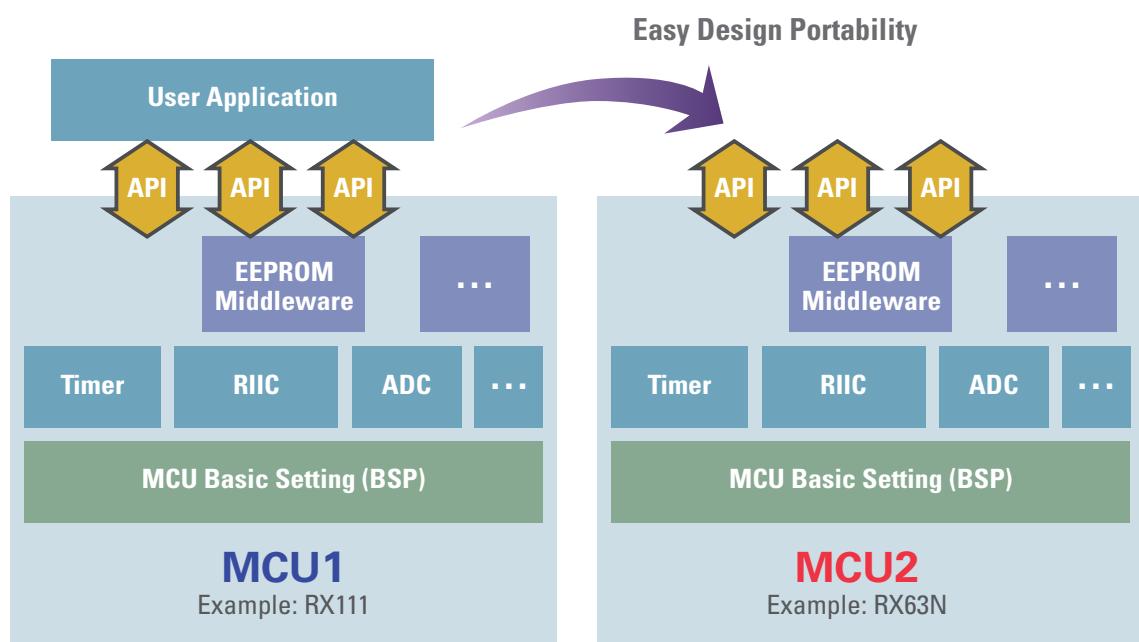


FIT provides:

- Common file and directory structure
- Common documentation practices
- Easy insertion into customer's project
- Ability to integrate multiple modules
- Simple configuration
- Strong foundation to build code
- Common platform for installation of modules

FIT Enables Portability:

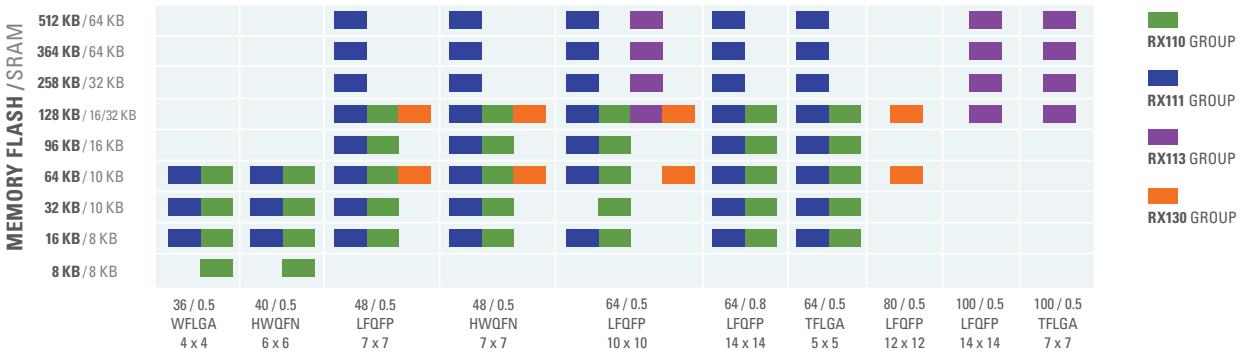
- API-based implementation
- User application can move to another MCU easily



FIT Module Name	RX113	RX111	RX110
BSP	✓	✓	✓
CGC	✓	✓	✓
MPC	✓	✓	✓
LPC	✓	✓	✓
12-bit ADC	✓	✓	✓
SCI Multi-Mode	✓	✓	✓
Byte Queue	✓	✓	✓
Long Queue	✓	✓	✓
IRQ	✓	✓	✓
LVD	✓	✓	✓
GPIO	✓	✓	✓
RSPI	✓	✓	✓
CAC	✓	✓	✓

FIT Module Name	RX113	RX111	RX110
CMT	✓	✓	✓
RTC	✓	✓	✓
DAC	✓	✓	NA
IWDT	✓	✓	✓
MTU/TPU	✓	✓	✓
ELC	✓	✓	NA
RIIC	✓	✓	✓
SCI Simple I2C	✓	✓	✓
RIIC Module for EEPROM Access	✓	✓	✓
Simple I2C Module for EEPROM Access	✓	✓	✓
SSI	✓	NA	NA
LCD	✓	NA	NA

RX100 MCU SERIES PORTFOLIO



All devices available in -40 – 85°C version, please check with Renesas for versions supporting 105°C operation.

RX100 SERIES PERIPHERAL FUNCTIONS

	USB	LCD	Cap Touch	I ² S
RX130	—	—	✓	—
RX113	✓	✓	✓	✓
RX111	✓	—	—	—
RX110	—	—	—	—

RX100 SERIES DEVICES

	Part Number	MHz	Flash Size (KB)	Data Flash (KB)	VCC (V)	RAM (KB)	16-bit Timers	Watchdog Timers	Motor Control Timer	RTC	A/D 12-bit	DAC	Op-Amps	SCI	SPI	I ² C	GPIO	Pin Count/Package Type	Pin pitch (mm)	Package	
RX130 Group	R5F51303ADFL#30	32	64	8	1.8-5.5	10	8	1	—	—	10	0	—	—	—	—	38	48-LQFP	0.5	PLQP0048KB-A 7x7mm	
	R5F51303ADFK#30									Y	14	2	Y	4	5	5	52	64-LQFP	0.8	PLQP0064GA-A 14x14mm	
	R5F51303ADFM#30									Y	14	2	Y	4	5	5	52	64-LQFP	0.5	PLQP0064KB-A 10x10mm	
	R5F51303ADFN#30									Y	17	2	—	—	—	—	68	80-LQFP	0.5	PLQP0080KB-A 12x12mm	
	R5F51303ADNE#U0									—	10	0	—	—	—	—	38	48-LQFP	0.5	PWQN0048KB-A 7x7mm	
RX113 Group	R5F51305ADFL#30	32	128	8	1.8-5.5	16	8	1	—	—	10	0	—	—	—	—	38	48-LQFP	0.5	PLQP0048KB-A 7x7mm	
	R5F51305ADFK#30									Y	14	2	Y	4	5	5	52	64-LQFP	0.8	PLQP0064GA-A 14x14mm	
	R5F51305ADFM#30									Y	14	2	Y	4	5	5	52	64-LQFP	0.5	PLQP0064KB-A 10x10mm	
	R5F51305ADFN#30									Y	17	2	—	—	—	—	68	80-LQFP	0.5	PLQP0080KB-A 12x12mm	
	R5F51305ADNE#U0									—	10	0	—	—	—	—	38	48-HWQFN	0.5	PWQN0048KB-A 7x7mm	
RX111 Group	R5F51138ADFP#3A	32	512	8	1.8-3.6	64	8	1	1	1	11	17	2	Y	8	9	9	82	100-LQFP	0.5	PLQP0100KB-A: 14x14mm
	R5F51138ADFM#3A									17	11	17	2	Y	8	9	9	46	64-LQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51138ADLJ#2A									17	11	17	2	Y	8	9	9	82	100-TFLGA	0.65	PTLG0100JA-A: 7x7mm
	R5F51137ADFP#3A									17	11	17	2	Y	8	9	9	82	100-LQFP	0.5	PLQP0100KB-A: 14x14mm
	R5F51137ADFM#3A									17	11	17	2	Y	8	9	9	46	64-LQFP	0.5	PLQP0064KB-A: 10x10mm
RX113 Group	R5F51137ADLJ#2A									17	11	17	2	Y	8	9	9	82	100-TFLGA	0.65	PTLG0100JA-A: 7x7mm
	R5F51136ADFP#3A									17	11	17	2	Y	8	9	9	82	100-LQFP	0.5	PLQP0100KB-A: 14x14mm
	R5F51136ADFM#3A									17	11	17	2	Y	8	9	9	46	64-LQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51136ADLJ#2A									17	11	17	2	Y	8	9	9	82	100-TFLGA	0.65	PTLG0100JA-A: 7x7mm
	R5F51135ADFP#3A									17	11	17	2	Y	8	9	9	82	100-LQFP	0.5	PLQP0100KB-A: 14x14mm
RX111 Group	R5F51135ADFM#3A	32	256	8	1.8-3.6	64	8	1	1	1	11	17	2	Y	8	9	9	46	64-LQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51135ADLJ#2A									17	11	17	2	Y	8	9	9	82	100-TFLGA	0.65	PTLG0100JA-A: 7x7mm
	R5F51118ADLJ#UA									14	10	14	2	Y	3	4	4	46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51118ADNE#UA									14	10	14	2	Y	3	4	4	30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51118ADFL#3A									14	10	14	2	Y	3	4	4	30	48-LQFP	0.5	PLQP0048KB-A: 7x7mm
RX111 Group	R5F51118ADFM#3A									14	10	14	2	Y	3	4	4	46	64-LQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51118ADFK#3A									14	10	14	2	Y	3	4	4	46	64-LQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51117ADLF#UA									14	10	14	2	Y	3	4	4	46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51117ADNE#UA									14	10	14	2	Y	3	4	4	30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51117ADFL#3A									14	10	14	2	Y	3	4	4	30	48-LQFP	0.5	PLQP0048KB-A: 7x7mm
RX111 Group	R5F51117ADFM#3A									14	10	14	2	Y	3	4	4	46	64-LQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51117ADFK#3A									14	10	14	2	Y	3	4	4	46	64-LQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51116ADLF#UA									14	10	14	2	Y	3	4	4	46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51116ADNE#UA									14	10	14	2	Y	3	4	4	30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51116ADFL#3A									14	10	14	2	Y	3	4	4	30	48-LQFP	0.5	PLQP0048KB-A: 7x7mm
RX111 Group	R5F51116ADFM#3A									14	10	14	2	Y	3	4	4	46	64-LQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51116ADFK#3A									14	10	14	2	Y	3	4	4	46	64-LQFP	0.8	PLQP0064GA-A: 14x14mm

RX100 SERIES DEVICES

	Part Number	MHz	Flash Size (KB)	Data Flash (KB)	VCC (V)	RAM (KB)	16-bit Timers	Watchdog Timers	Motor Control Timer	RTC	A/D 12-bit	DAC	Op-Amps	SCI	SPI	I ² C	GPIO	Pin Count/ Package Type	Pin pitch (mm)	Package
RX111 Group	R5F51115ADFM#3A	32	128	8	1.8-3.6	16	8	1	1	1	14	2	Y	3	4	4	46	64-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51115ADFK#3A										14						46	64-LQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51115ADLF#UA										14						46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51115ADFL#3A										10						30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51115ADNE#UA										10						30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51114ADFM#3A	32	96	8	1.8-3.6	16	8	1	1	1	14	2	Y	3	4	4	46	64-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51114ADFK#3A										14						46	64-LQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51114ADLF#UA										10						46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51114ADFL#3A										10						30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51114ADNE#UA										10						30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
RX110 Group	R5F51113ADFM#3A	32	64	8	1.8-3.6	10	8	1	1	1	1	2	Y	3	4	4	46	64-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51113ADFK#3A										1						46	64-LQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51113ADLF#UA										1						46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51113ADFL#3A										1						30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51113ADNE#UA										1						30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51113ADNF#UA	32	32	8	1.8-3.6	10	8	1	1	1	1	2	Y	3	4	4	24	40-HWQFN	0.5	PWQN0040KC-A: 6x6mm
	R5F51113ADLM#UA										1						20	36-WFLGA	0.5	PWLG0036KA-A: 4x4mm
	R5F51111ADFM#3A										1						30	48-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51111ADFK#3A										1						30	48-LQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51111ADLF#UA										1						30	48-WFLGA	0.5	PWLG0064KA-A: 5x5mm
RX110 Group	R5F51111ADFL#3A	32	16	8	1.8-3.6	8	8	1	1	1	1	2	Y	3	4	4	24	40-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51111ADNE#UA										1						24	40-HWQFN	0.5	PWQN0040KC-A: 6x6mm
	R5F51111ADNF#UA										1						24	36-WFLGA	0.5	PWLG0036KA-A: 4x4mm
	R5F51111ADLM#UA										1						30	48-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51111ADFK#3A										1						30	48-LQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51105ADNE#U0	32	128	-	1.8-3.6	16	2	1	-	1	10	-	Y	3	4	4	30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51105ADFL#30										10						30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51105ADLF#U0										14						46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51105ADFM#30										14						46	64-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51105ADFK#30										14						46	64-LFQFP	0.8	PLQP0064GA-A: 14x14mm
RX110 Group	R5F51104ADNE#U0	32	96	-	1.8-3.6	16	2	1	-	1	10	-	Y	3	4	4	30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51104ADFL#30										10						30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51104ADLF#U0										14						46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51104ADNE#UA										14						30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51104ADNF#UA										14						46	40-HWQFN	0.5	PWQN0040KC-A: 6x6mm
	R5F51103ADLM#U0	32	64	-	1.8-3.6	10	2	1	-	1	10	-	Y	3	4	4	24	36-WFLGA	0.5	PWLG0036KA-A: 4x4mm
	R5F51103ADNF#U0										8						24	40-HWQFN	0.5	PWQN0048KB-A: 6x6mm
	R5F51103ADNE#U0										10						30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51103ADFL#30										10						30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51103ADLF#U0										14						46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
RX110 Group	R5F51103ADFM#30	32	16	-	1.8-3.6	8	2	1	-	1	10	-	Y	3	4	4	46	64-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51103ADFK#30										14						46	64-LFQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51101ADLM#U0										14						24	36-WFLGA	0.5	PWLG0036KA-A: 4x4mm
	R5F51101ADNF#U0										14						28	40-HWQFN	0.5	PWQN0040KC-A: 6x6mm
	R5F51101ADNE#U0										10						30	48-HWQFN	0.5	PWQN0048KB-A: 7x7mm
	R5F51101ADFL#30	32	8	-	1.8-3.6	8	2	1	-	1	10	-	Y	3	4	4	30	48-LFQFP	0.5	PLQP0048KB-A: 7x7mm
	R5F51101ADLF#U0										14						46	64-WFLGA	0.5	PWLG0064KA-A: 5x5mm
	R5F51101ADFM#30										14						46	64-LFQFP	0.5	PLQP0064KB-A: 10x10mm
	R5F51101ADFK#30										14						46	64-LFQFP	0.8	PLQP0064GA-A: 14x14mm
	R5F51101ADLM#U0	32																		

GET UP AND RUNNING WITH THE RX ECOSYSTEM

Renesas makes it easy to launch new system designs. Our comprehensive hardware and software tools – including very low cost and free products – help swiftly advance the product development process from concept stage to final RX-based design.

Renesas Customizable Software Library

Applilet is a support tool that makes it easy to generate code optimized for an RX100 MCU. It functions through a simple GUI windows application or via an e² studio plug-in. This tool generates customizable device drivers that compile and work right out of the box.



www.renesas.com/applilet

RX100 Renesas Promotion Board (RPB)

The RPB was designed to showcase RX100 low power modes, featuring Pmod™ and energy harvesting connectors, and comes loaded with software and tools.

- Integrated J-Link debugger
- Power measurement built in
- Applilet
- e² studio toolchain
- USB Demo



RX111 RPB

P/N: YRPBRX111

www.renesas.com/RPBRX111

RX100 Renesas Starter Kits (RSK)

These complete RX100-based hardware/software platforms for in-depth application design include the E1 Debugger, e² studio, demonstration firmware, and a trial version of the Renesas RX compiler.



RX111 RSK

P/N: YROK505111S000BE

www.renesas.com/RSKRX111

RX113 RSK

P/N: YROK5051135000BE

www.renesas.com/RSKRX113

e² studio – the Eclipse-based Integrated Development Environment (IDE) from Renesas

The e² studio IDE is a complete development and debug environment based on the popular Eclipse platform and the associated C/C++ Development Tooling (CDT) project.

Basic Features	Advanced Debug Features
<ul style="list-style-type: none">– Connect / Disconnect– Run / Stop (Resume / Suspend)– Software breakpoints– Source step / disassembly step	<ul style="list-style-type: none">– Variable and Expression views– Register view– Basic Memory view– Endian selection <ul style="list-style-type: none">– Renesas Debug view with Call Stack– I/O Registers view– Trace view– Eventpoints view <ul style="list-style-type: none">– Real-time Expression view– Real-time Memory view– Real-time Chart view

www.renesas.com/e2studio

Complete Debugging, Emulation, and Programming

On-chip debugging of an RX-based application is performed via a debug connection to the target and USB connection to the Windows-based IDE. The Renesas E1 and E20 debuggers offer thorough CPU control and visibility.



Renesas E1

P/N: ROE000010KCE00

www.renesas.com/tools

Renesas E20

P/N: ROE000200KCT00

Third-party Solutions

Compilers	 IAR SYSTEMS www.iar.com/ewrx	The IAR Embedded Workbench for RX is now available in two editions – The EWRX Standard edition and the new EWRX-BL Baseline edition, which is targeted at developers working with Renesas RX MCUs with smaller memory like the RX100 Series. The Baseline edition is limited to a code size of 256 KB, but otherwise provides a fully functional IDE, including project manager, editor, compiler, assembler, linker librarian, and debugger tools. NEW: Free 64 KB size-limited Kickstart version is now also available!	 KPT Cummins Infosystems Limited www.kptgnutools.com
KPT GNURX compiler			

	 Micrium www.micrium.com	 CMX SYSTEMS www.cmx.com	 RoweBots www.rowebots.com	 express logic www.expresslogic.com	 FreeRTOS www.freertos.org	 SEGGER www.segger.com
RTOS	μC/OS-III	CMX-RTX	Unison	ThreadX	FreeRTOS	embOS
USB	✓	✓	✓	✓		✓



Renesas Electronics America Inc. | renesas.com
2801 Scott Boulevard, Santa Clara, CA 95050-2554 | Phone: 1 (408) 588-6000

© 2017 Renesas Electronics America Inc. (REA). All rights reserved. Cortex is a registered trademark of ARM; CoreMark is a trademark of EEMBC. All other trademarks are the property of their respective owners. REA believes the information herein was accurate when given but assumes no risk as to its quality or use. All information is provided as-is without warranties of any kind, whether express, implied, statutory, or arising from course of dealing, usage, or trade practice, including without limitation as to merchantability, fitness for a particular purpose, or non-infringement. REA shall not be liable for any direct, indirect, special, consequential, incidental, or other damages whatsoever, arising from use of or reliance on the information herein, even if advised of the possibility of such damages. REA reserves the right, without notice, to discontinue products or make changes to the design or specifications of its products or other information herein. All contents are protected by U.S. and international copyright laws. Except as specifically permitted herein, no portion of this material may be reproduced in any form, or by any means, without prior written permission from Renesas Electronics America Inc. Visitors or users are not permitted to modify, distribute, publish, transmit or create derivative works of any of this material for any public or commercial purposes.

