The Core Difference in Your Design

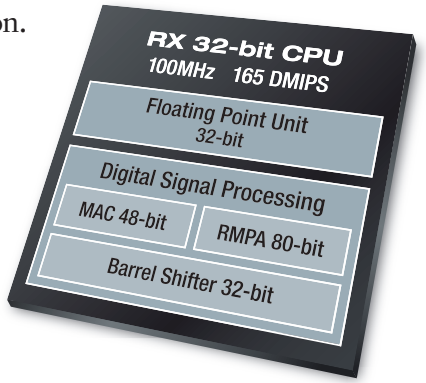
RX600 Microcontrollers

Renesas Electronics America
www.am.renesas.com

Performance without Sacrifice

RX600 series microcontrollers deliver the very latest technology from Renesas, the world's #1 MCU supplier*. The new RX600 chips are MCU/DSP hybrids: Digital Signal Controllers. They provide both superb MCU performance and powerful signal-processing capabilities, bolstered by the industry's fastest embedded Flash memory – all while achieving very low power consumption. These versatile and economical MCUs are scalable for many applications and are supported by a rich ecosystem offering development tools and middleware.

RX THE CORE DIFFERENCE



Memory
- Zero-wait Flash up to 2MB
- SRAM up to 128KB
- Data Flash up to 32KB

System
- DMA & Event System
- Fast Interrupt Handler
- Clock Generation
- POR/LVD

Analog
- 12-bit ADC Prog Op Amps Multi-sample/Hold Comparators
- 10-bit ADC
- 10-bit DAC

Timers
- Motor Control 3-phase PWM Dead-time Insertion Shunt Control PFC, QEI
- Timer Pulse Unit
- Compare/Match Timer
- General Purpose Timer
- Multi-function Timer
- Prog Pulse Generator
- Watchdog Timer
- Real-time Clock

Communication
- Ethernet 10/100 MAC with DMA
- USB 12Mbps Host/Device/OTG
- CAN
- LIN
- I²C
- SCI/UART
- SPI
- External Bus with SDRAM
- GPIO

CPU Performance

165 DMIPS at 100MHz
> Gives the most performance in class, or offers maximum power efficiency when operated at slower speeds

Enhanced Harvard architecture and 5-stage pipeline
> Achieves one instruction per clock with simultaneous data access for best efficiency

More than six internal busses
> Reduces bottlenecks between CPU, memory, DMA, peripherals, and external bus

Multiple Direct Memory Access control
> Provides flexible hardware- and software-based DMA channels for maximum data flow

Rapid interrupt response
> Reacts to interrupts in as few as five CPU clock cycles for handling hard real-time control applications

Fast 90 nanometer Flash

Zero wait-state access at 100MHz
> CPU receives instructions from Flash with no delay even at 100MHz for optimum predictable performance

Mature and reliable silicon process
> Process has been in production for 3 years

Scalability

Wide selection of memory and packages
> Maximize your software investment across small, medium, and large projects

Key peripherals at your fingertips
> Connectivity abounds with Ethernet, USB, CAN plus human-machine interface TFT-LCD
> Specialized motor control timers with 1µsec 12-bit ADCs and programmable gain opamps

FPU/DSP

32-bit Floating Point Unit (IEEE-754)
> Perform complex non-linear math in fewer clock cycles, reduce code and data size, and benefit from easy firmware development

32-bit Multiply-Accumulate w/ 80-bit result
> Can eliminate the need for a separate DSP or ASIC device in signal processing application

Efficiency

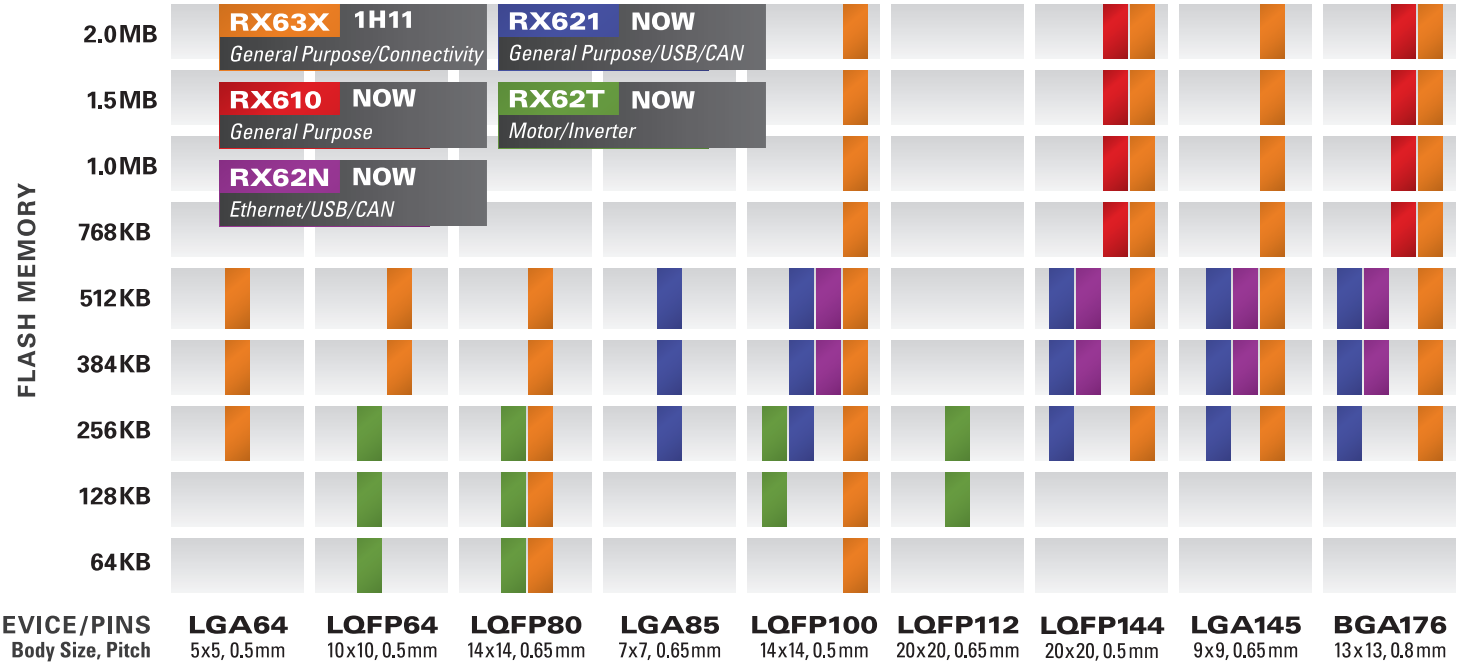
Very low power consumption
> 1mW per DMIPS with all peripherals active
> Under 1µA Deep Standby on RX610
> Extends battery life in portable applications

Extremely compact code
> Variable-length CISC instructions can reduce code size as much as 28% compared to popular 32-bit RISC MCUs in the market

For more information, stop by
www.renesas.com/rx

** Source: Gartner 2009 Worldwide Semiconductor Market Share Database, March 2010 results*

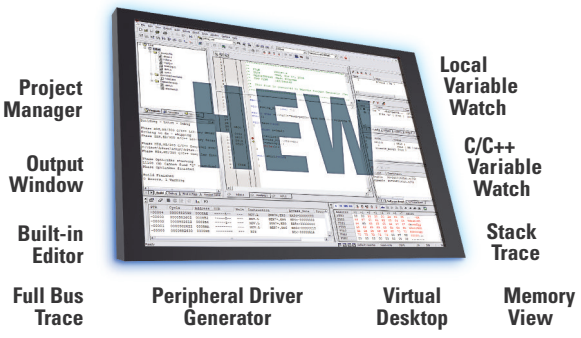
RX600 MCU Series Portfolio



Development Tools and Kits

Complete Integrated Development Environment

Renesas' High Performance Embedded Workshop (HEW) provides a single IDE for full C/C++ development – from editing to peripheral driver generation to compilation to debugging to Flash programming. Try HEW for free, unlimited for 60 days, then limited to 128KB compile size.

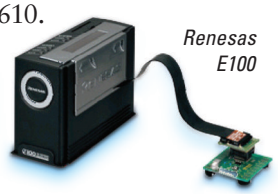


Complete Debugging, Emulation, and Programming

Do on-chip debugging with JTAG connection to the target and USB connection to the Windows-based HEW IDE. E1 and J-Link offer thorough CPU control and visibility. E20 adds high-speed tracing. E100 enables full in-circuit emulation for RX610.

Renesas E1 & E20

SEGGER J-Link



Renesas E100

Suggested Retail Prices

HEW & C/C++	$1200
E1 Debugger	$150
E20 Debug/Trace	$995
E100 Emulator	$3400
RX62N Starter Kit	$550
RX62N Demo Kit	$99
SEGGER J-Link	$299

RX62N Starter Kit

Complete hardware platform to evaluate RX and develop your project. Includes E1 Debugger, trial HEW IDE, demo firmware.

R0K5562N0S000BE

Direct Third-Party Support for RX

Integrated Development Environment

IAR SYSTEMS

> EWRX IDE with optimizing C/C++ compiler from IAR Systems, with C-Spy debugging through J-Link, E1, and E20

> Free C/C++ GNURX compiler runs within Eclipse IDE with J-Link debugging, supported by KPIT Cummins. GNURX compiler also runs within HEW IDE from Renesas

eclipse

KPIT Cummins Infosystems Limited

RTOS and Middleware

Micrium

> Full RX600 support now for µC/OS-II & µC/OS-III RTOS, µC/Probe, µC/TCP-IP, and µC/File System. µC/USB and µC/GUI coming in Q4, 2010

SEGGER

> embOS RTOS, embOS/IP (TCP/IP), emUSB, emFile (file management), and emWin (GUI library) here now

CMX SYSTEMS

> RTX RTOS, MicroNet, and TCP/IP supported now, with USB and more coming in Q4, 2010

freeRTOS

> freeRTOS is ported to RX600 with support available at www.freertos.org

RX600 Series MCU Selector Guide

Operating range for all devices listed: -40ºC to +85ºC

For more information, visit
www.renesas.com/rx

Device		Operation		Memory			Serial Interface							Parallel Int.		Timer				Analog								
Group	Part Number	Max CPU Speed (MHz)	Voltage Range (V)	FLASH	SRAM	Data Flash	Ethernet MAC	USB Host Dev OTG	CAN	SCI	SPI	I²C	LIN	External Data Bus	TFT-LCD	8-bit	16-bit	RTC	Watchdog	12-bit ADC	10-bit ADC	10bit DAC	Prog Op Amp	POR LVD	GPIO	Package
RX610	R5F56108WDBG	100	3.0-3.6	2048	128	32	–	–	–	7	(7)*	2	–	Y	–	4	22	–	1	–	16	2	–	–	140	BGA176
	R5F56107WDBG			1536																						
	R5F56106WDBG			1024																						
	R5F56104WDBG			768																						
	R5F56108VDFP			2048	128	32	–	–	–	7	(7)*	2	–	Y	–	4	22	–	1	–	16	2	–	–	140	LQFP144
	R5F56107VDFP			1536																						
	R5F56106VDFP			1024																						
	R5F56104VDFP			768																						
RX621	R5F56218BDBG	100	2.7-3.6	512	96	32	–	2	1	6	2	2	–	SDRAM	Y	4	16	Y	2	8 or 8		2	–	Y	128	BGA176
	R5F56217BDBG			384	64																					
	R5F56216BDBG			256	64																					
	R5F56218BDLE			512	96	32	–	1	1	6	2	2	–	SDRAM	Y	4	16	Y	2	8 or 8		2	–	Y	105	LGA145
	R5F56217BDLE			384	64																					
	R5F56216BDLE			256	64																					
	R5F56218BDFB			512	96	32	–	1	1	6	2	2	–	SDRAM	Y	4	16	Y	2	8 or 8		2	–	Y	105	LQFP144
	R5F56217BDFB			384	64																					
	R5F56216BDFB			256	64																					
	R5F56218BDFP			512	96	32	–	1	1	6	2	2	–	Y	–	4	16	Y	1	8 or 8		1	–	Y	74	LQFP100
	R5F56217BDFP			384	64																					
	R5F56216BDFP			256	64																					
	R5F56218BDLD			512	96	32	–	1	1	6	2	2	–	Y	–	4	16	Y	1	8 or 8		1	–	Y	60	LGA85
	R5F56217BDLD			384	64																					
	R5F56216BDLD			256	64																					
RX62N	R5F562N8BDBG	100	2.7-3.6	512	96	32	Y	2	1	6	2	2	–	SDRAM	Y	4	16	Y	2	8 or 8		2	–	Y	128	BGA176
	R5F562N8ADBG								–																	
	R5F562N7BDBG			384	64				1																	
	R5F562N7ADBG								–																	
	R5F562N8BDLE			512	96	32	Y	1	1	6	2	2	–	SDRAM	Y	4	16	Y	2	8 or 8		2	–	Y	105	LGA145
	R5F562N8ADLE								–																	
	R5F562N7BDLE			384	64				1																	
	R5F562N7ADLE								–																	
	R5F562N8BDFB			512	96	32	Y	1	1	6	2	2	–	SDRAM	Y	4	16	Y	2	8 or 8		2	–	Y	105	LQFP144
	R5F562N8ADFB								–																	
	R5F562N7BDFB			384	64				1																	
	R5F562N7ADFB								–																	
	R5F562N8BDFP			512	96	32	Y	1	1	6	2	1	–	Y	–	4	16	Y	2	8 or 8		1	–	Y	74	LQFP100
	R5F562N8ADFP								–																	
	R5F562N7BDFP			384	64				1																	
	R5F562N7ADFP								–																	
RX62T	R5F562TABDFP	100	2.7-3.6	256	16	32	–	–	1	3	1	1	1	–	–	–	16	–	2	8	12	–	6	Y	76	LFP100
	R5F562TAADFP		4.0-5.5						–																	
	R5F562TAEDFP		2.7-3.6																							
	R5F562TADDFP		4.0-5.5																							
	R5F562T7BDFP		2.7-3.6	128	8	8	–	–	1	3	1	1	1	–	–	–	16	–	2	8	12	–	6	Y	76	
	R5F562T7ADFP		4.0-5.5						–																	
	R5F562T7EDFP		2.7-3.6																							
	R5F562T7DDFP		4.0-5.5																							
	R5F562TABDFM	100	2.7-3.6	256	16	32	–	–	1	3	1	1	1	–	–	–	16	–	2	8	–	–	6	Y	46	LQFP64
	R5F562TAADFM	80	4.0-5.5						–																	
	R5F562TAEDFM	100	2.7-3.6																							
	R5F562TADDFM	80	4.0-5.5																							
	R5F562T7BDFM	100	2.7-3.6	128	8	8	–	–	1	3	1	1	1	–	–	–	16	–	2	8	–	–	6	Y	46	
	R5F562T7ADFM	80	4.0-5.5						–																	
	R5F562T7EDFM	100	2.7-3.6																							
	R5F562T7DDFM	80	4.0-5.5																							
	R5F562T6BDFM	100	2.7-3.6	64	8	8	–	–	1	3	1	1	1	–	–	–	16	–	2	8	–	–	6	Y	46	
	R5F562T6ADFM	80	4.0-5.5						–																	
	R5F562T6EDFM	100	2.7-3.6																							
	R5F562T6DDFM	80	4.0-5.5																							

**Uses SCI channel*

The Renesas Ecosystem

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Renesas Electronics America Inc. | 2880 Scott Boulevard, Santa Clara, CA 95050-2554 | Phone: 1 (408) 588-6000, Literature/technical support: 1 (800) 366-9782 | www.am.renesas.com

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