SuperH platform brochure

32-bit RISC Microcontrollers

Renesas Electronics
www.renesas.eu

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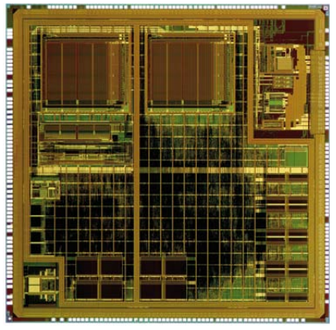
Introduction

About Renesas Electronics Corporation

Renesas Electronics Corporation (TSE: 6723), the world's number one supplier of microcontrollers, is a premier supplier of advanced semiconductor solutions including microcontrollers, SoC solutions and a broad-range of analog and power devices. Business operations began as Renesas Electronics in April 2010 through the integration of NEC Electronics Corporation (TSE:6723) and Renesas Technology Corp., with operations spanning research, development, design and manufacturing for a wide range of applications. Headquartered in Japan, Renesas Electronics has subsidiaries in approximately 20 countries worldwide.

More information can be found at **www.renesas.com**

Renesas Electronics owes its success to its outstanding technology, its excellent quality and to its drive and commitment to listening to customers and meeting their needs. As a result, today Renesas is the world's leading microcontroller company, offering a huge range of 8, 16 and 32-bit microcontrollers.



These feature:

> A complete product line-up
> Outstanding memory integration
> World-leading embedded Flash technology
> Leading peripheral integration
> High-performance CPU's
> Low power consumption
> Low EMS / EMI
> Advanced packaging options

The SuperH family

The 32-bit RISC SuperH architecture offers the highest performance through its leading-edge technology. It comprises a wide range of optimised, peripheral-rich devices designed for an optimum cost/performance ratio, making it suitable for a wide range of applications including real-time control, high end motor control, multimedia and highly sophisticated user interfaces. The SuperH family is based on three device families which offer upward scalability, software re-usability and an optimised performance, as well as peripheral match for dedicated applications.

> The SuperH controller (Flash) family is suitable for all high-speed applications, such as factory automation, motor control, induction heating, connectivity and any development where a fast real-time response is required. It features from 16kB to 1MB of integrated MONOS Flash.

> The SuperH controller (ROMless) family has been designed for general purpose, real-time, connectivity and visualisation applications. These devices do not have an MMU and are therefore suitable for running RTOS and Linux.

> SuperH processor solutions (SH-3/SH-4A) from 200 to 1000DMIPS provide highly integrated systems comprising various connectivity solutions like USB, PCI or 2-channel G-Ether, with multimedia processing capabilities for audio/video encoding and decoding.

The SuperH family

Key features and advantages of the SuperH device families

Technical

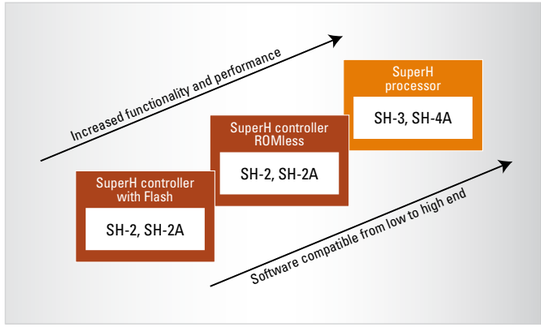
> 32-bit RISC architecture.
> Superscalar instruction processing.
> Advanced Cache concepts.
> Very high code density through 16-bit instruction length.
> Integrated FPU with up to 4.2GFLOPS performance and DSP extensions.
> Up to 2.5MB integrated RAM

Fast

> Performance from 50 to 600MHz, providing up to 2.4DMIPS/MHz with more than 1000DMIPS for top-end devices.
> Renesas' proprietary MONOS Flash technology, the world's fastest integrated Flash technology supporting 10ns access time.
> SH-2A device architecture supporting the industry benchmark of a 30ns interrupt response time.

Scaleable

> Software compatibility across the CPU cores for software re-use from low-end to high-end and scalability throughout the families.
> From 16kB up to 1MB of Flash (and even up to 3.75MB for specific applications).
> Package options from tiny 7 x 7mm QFN packages up to large 449-pin BGA packages.



Connectivity

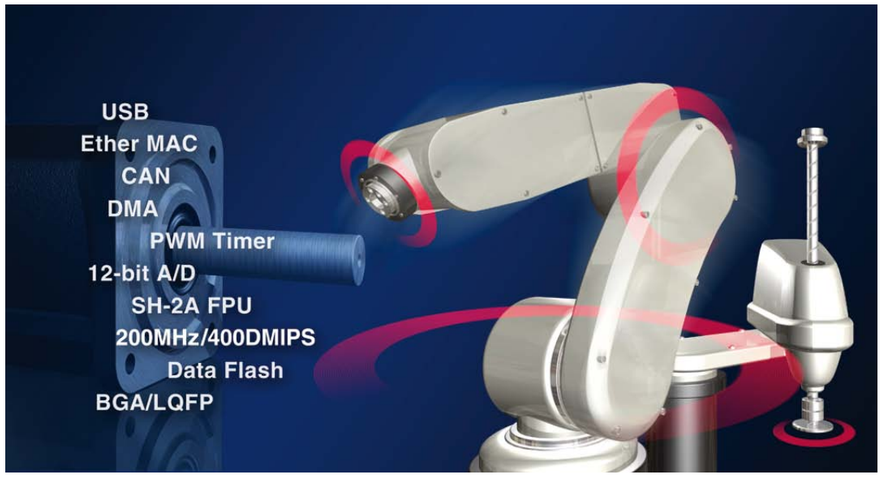
> With all the connectivity features that you could wish for on a high-end processor, the SuperH family offers CAN, USB, Ethernet (including up to dual-channel Gbit Ethernet) and PCI.
> Megapixel camera interfaces, SIM card, SD card and TV output options.

Low power

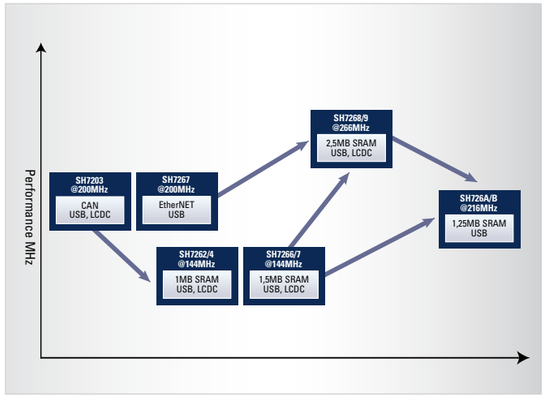
> Setting the industry benchmark with leading MIPS/Watt performance as low as 0.5mW/MIPS.
> Efficient power-saving methodologies that are easy to implement.

Future-proof

> Forthcoming multi-core implementations for further performance increase.
> Long-term product availability.



SuperH controller ROMless product line up



The SuperH controller family includes various ROMless parts. These parts provide several connectivity features, as well as support for visualisation applications. As these devices do not have an MMU on board, they are supported by the Linux Operating System.

Key benefits of the SuperH controller ROMless platform

Fast
The SH-2A core is a superscalar core. This means that it can execute two instructions in a single clock cycle. It achieves up to 630DMIPS performance.

Visualisation
The SuperH controller family features several peripherals to assist in the driving of TFT screens and is supported by a wide range of software to support this functionality. Including up to 2.5MB of integrated SRAM.

Scaleable
As the middle-ground of the SuperH platform, the SHC-ROMless family allows for signifi cant further expansion with the SuperH processor while also allowing for cost and feature reductions with SuperH controllers with embedded Flash.

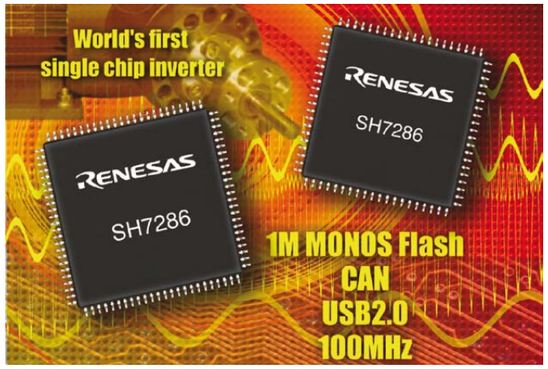
Connectivity
With all the connectivity features that you could wish for on a high-end processor, the SuperH family offers CAN, USB, and Ethernet. The SuperH controller ROMless family has all the connectivity features required for a wide variety of applications and fields.

Integration
The SH Romless controller family also incorporates devices with up to 2.5MB of integrated RAM meaning that you can replace the external RAM and video buffer with this internal RAM. Additionally because these devices can run the code from this internal RAM, the external NOR Flash can be replaced by a cheaper serial Flash. This can offer a signifi cant BOM cost saving.

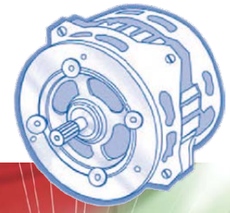
Easy
With tools including a full Linux Board support package, and several code examples, the SuperH controller ROMless family is very easy to get started with. This, combined with a series of operating systems from a number of vendors to suit all needs means that the SuperH controller family provides an excellent ‘straight out of the box’ experience.

Application examples

Inverters
With fantastic real-time response and high performance, combined with specialist motor control timers and analogue to digital converters, it is no surprise that the SuperH is the MCU of choice for a huge number of inverter customers across Europe. The scalability and flexibility of the family means that whether the inverter requires a single MCU, dual MCU or multiple MCU architecture, there is a SuperH device to suit the application.



White goods motor control
There is no doubt that the market for low-end motor control is changing. Developers are using more efficient motors which also have a longer lifetime. In order to achieve these efficiency savings, the new motors require much more complicated control algorithms and therefore demand higher performance microcontrollers. This is not a new trend, but is gaining momentum as the cost of energy continues to rise and the drive for lower consumption increases, influenced by pressure from consumers and by new regulations.



The SH/Tiny has been designed to meet current trends in the low-end motor control market and facilitate easy implementation. It also brings several advantages when compared to standard digital signal processing solutions. SH/Tiny has been designed with much thought and focus on the details of motor control and thus provides a quantum leap in the cost-performance ratio of low-end motor drives.

Visualisation, Graphical User Interfaces and low-power multimedia processing
Several of the SuperH processors and SuperH controller ROMless devices integrate special features for controlling displays, inc luding up to 2.5MB of SRAM for use as a video buffer For visualisation and multimedia, many microcontroller and processor users immediately turn to SuperH, with its high-performance and dedicated display-driving peripherals making it the ideal family to cover the visualisation and the whole application side as well.

High Definition video surveillance over IP
The SH7724 is the perfect device for video surveillance applications like IP cameras. Two 5 Mpix Camera Interfaces allow the user to capture video from two separate independent video sources. This stream can then be compressed using the integrated Video Processing Unit to MPEG4 or H.264 formats which are small enough for fast and efficient transmission over Ethernet which is also supported on the SH7724. Needless to say all that is facilitated by Renesas software including middleware and Linux as well.

SHC

Device			Memory		Interfaces					Timers & Other Peripherals										Miscellaneous Information			
Core	Nickname	Part Number	Size [KB]	RAM [Byte]	I/O /Pins	SPI/ UARTs/ I²C	CAN	USB	Ethernet	Timer Channels (8-bit/16-bit)	Special Timers	PWMs	Clock speed [MHz]	Internal Oscillator(s)	Subclock 32.768 kHz	TFT control	A/D / D/A-Converter	Analog Features	DMA	Supply Voltage [V]	Packages	Qualification	Other Features*	Starter Kit
SH2A-FPU	SH726A	R5S726A0D216FP#V0	-	64kB URAM + 1.25MB SRAM	120pin	2ch / 5ch / 4ch	-	1ch, F/S H+F	-	16ch 10bit / 5 + 2ch 16 bit	-	21	216	-	-	no	6ch x 10bit / -	-	16ch	1.2V + 3.3V	QFP120 16 x 16mm	Industry	4ch SSI, NAND, RTC, SD Host	TBD
		R5S726A0P216FP#VZ					-															Automotive		
		R5S726A1D216FP#V0					2ch															Industry		
		R5S726A1P216FP#VZ					2ch															Automotive		
		R5S726A2D216FP#V0					-														QFP120 14 x 14mm	Industry		
		R5S726A2P216FP#VZ					-															Automotive		
		R5S726A3D216FP#V0					2ch															Industry		
		R5S726A3P216FP#VZ					2ch															Automotive		
	SH726B	R5S726B0D216FP#V0			144pin	3ch / 5ch /4ch	-										8ch x 10bit / -				QFP144 20 x 20mm	Industry		
		R5S726B0P216FP#VZ					-															Automotive		
		R5S726B1D216FP#V0					2ch															Industry		
		R5S726B1P216FP#VZ					2ch															Automotive		
	7264	R5S72640W144FP#U0	–	64kB URAM + 1MB SRAM	99 I/O 176-pin	2ch / 8ch / 3ch	–	1ch. H/S H+F	–	16 x 10-bit/ 5 + 2 x 16-bit	–	21	144	–	–	✓	4 x 10-bit/-	–	16	1.2 + 3.3	176-pin 24x24 mm LQFP 0.5 mm pitch	Standard	4ch SSI, NAND, RTC, SD Host	R0K572643S000BE
		R5S72641W144FP#U0					1															Industrial		
		R5S72640P144FP#U0					–															Standard		
		R5S72641P144FP#U0					1															Industrial		
		R5S72644W144FP#U0		64kB URAM + 640kB SRAM			–																	
		R5S72645W144FP#U0					1																	
		R5S72644P144FP#U0					–																	
		R5S72645P144FP#U0					1																	
	7262	R5S72620W144FP#U0	–	64kB URAM + 1MB SRAM	129 I/O 208-pin	2ch / 8ch / 3ch	–	1ch. H/S H+F	–	16 x 10-bit/ 5 + 2 x 16-bit	–	21	144	–	–	✓	8 x 10-bit/-	–	16	1.2 + 3.3	28x28 mm LQFP 0.5 mm pitch	Standard	4ch SSI, NAND, RTC, SD Host	R0K572643S000BE
		R5S72621W144FP#U0					1															Industrial		
		R5S72620P144FP#U0					–															Standard		
		R5S72621P144FP#U0					1															Industrial		
		R5S72624W144FP#U0		64kB URAM + 640kB SRAM			–																	
		R5S72625W144FP#U0					1																	
		R5S72624P144FP#U0					–																	
		R5S72625P144FP#U0					1																	
	7266	R5S72660P144FP#UZ	–	64kB URAM + 1.5MB SRAM	68 I/O 144-pin	2ch / 5ch / 3ch	–	1ch. H/S H+F	–	16 x 10-bit/ 5 + 2 x 16-bit	–	21	144	–	–	✓	6 x 10-bit/-	–	16	1.2 + 3.3	20x20 mm LQFP 0.5 mm pitch	Industrial	4ch SSI, NAND, RTC, SD Host	–
		R5S72661P144FP#UZ					1															Standard		
		R5S72660W144FP#U0					–																	
		R5S72661W144FP#U0					1																	
	7267	R5S72670P144FP#UZ	–	64kB URAM + 1.5MB SRAM	92 I/O 176-pin	2ch / 8ch / 3ch	–	1ch. H/S H+F	–	16 x 10-bit/ 5 + 2 x 16-bit	–	21	144	–	–	✓	6 x 10-bit/-	–	16	1.2 + 3.3	24x24 mm LQFP 0.5 mm pitch	Industrial	4ch SSI, NAND, RTC, SD Host	–
		R5S72671P144FP#UZ					1															Standard		
		R5S72670W144FP#U0					–																	
		R5S72671W144FP#U0					1																	
	7268	R5S72680P266FP#VZ	-	64kB URAM + 2.5MB SRAM	208pin	2ch / 8ch / 4ch	0	1ch. H/S H+F	-	16ch 10bit / 5 + 2ch 16 bit	-	21	266	-	-	yes	8ch x 10bit / -	-	16ch	1.2V + 3.3V	28x28mm LQFP 0.5mm Pitch	Automotive	OpenVG,PAL/NTSC,RTC;SDHC	R0K507269S000BE
		R5S72680W266FP#V0					3															Industrial		
		R5S72681P266FP#VZ																				Automotive		
		R5S72681W266FP#V0																				Industrial		
	7269	R5S72690P266BG#UZ		64kB URAM + 2.5MB SRAM	272 BGA		0														20x20mm BGA 0.8mm Pitch	Automotive		
		R5S72690P266FP#VZ			256 LQFP																30x30mm LQFP 0.4mm Pitch	Automotive		
		R5S72690W266BG#U0			272 BGA																20x20mm BGA 0.8mm Pitch	Industrial		
		R5S72690W266FP#V0			256 LQFP																30x30mm LQFP 0.4mm Pitch	Industrial		
		R5S72691P266BG#UZ			272 BGA		3														20x20mm BGA 0.8mm Pitch	Automotive		
		R5S72691P266FP#VZ			256 LQFP																30x30mm LQFP 0.4mm Pitch	Automotive		
		R5S72691W266BG#U0			272 BGA																20x20mm BGA 0.8mm Pitch	Industrial		
		R5S72691W266FP#V0			256 LQFP																30x30mm LQFP 0.4mm Pitch	Industrial		
	7670	R5S76700B200BG	–	32k	94 I/O 256-pin	- / 3ch / 1ch	–	1ch. H/S H+F	1	2 x 16-bit	–	2	200	–	–	–	–	–	8	1.2 + 3.3	17x17 mm BGA 0.8 mm pitch	Standard	4k HIF	R0K576700S000BE
		R5S76700D133BG																				Industrial		
		R5S76710B200BG																				Standard		
		R5S76710D133BG																				Industrial		
		R5S76720B200BG																				Standard		
		R5S76720D133BG																				Industrial		
		R5S76730B200BG																				Standard		
		R5S76730D133BG																				Industrial		
SH-2	7619	R4S76190B125BGV	–	16K	78 I/O 176-pin	1ch / 3ch / -	–	–	1 + PHY	2 x 16-bit	–	2	125	–	–	–	–	–	4	1.8 + 3.3	13x13 mm BGA 0.8 mm pitch	Standard	integrated PHY, 2k HIF	–
		R4S76190N125BGV																				Industrial		

Device			Memory		Interfaces					Timers & Other Peripherals											Miscellaneous Information			
Core	Nickname	Part Number	Size [KB]	RAM [Byte]	I/O /Pins	SPI/ UARTs/ I²C	CAN	USB	Ethernet	Timer Channels (8-bit/16-bit)	Special Timers	PWMs	Clock speed [MHz]	Internal Oscillator(s)	Subclock 32.768 kHz	TFT control	A/D / D/A-Converter	Analog Features	DMA	Supply Voltage [V]	Packages	Qualification	Other Features*	Starter Kit
SH2A-FPU Dual Core	7205	R5S72050W200BG	–	112k	107 / 272	2ch / 6ch / 4ch	2	1ch. H/S H+F	–	5 + 4 x 16-bit	–	14	2 x 200	–	–	✓	8 x 10-bit	2 x 8-bit	14	1.2 + 3.3	17x17 mm BGA 0.8 mm pitch	Industrial	Dual Core	–
SH2-A	7206	R5S72060W200FPV	–	128K	87 / 176	- / 4ch / 1ch	–	–	–	5+3+2 x 16-bit	–	14	200	–	–	–	8 x 10-bit	2 x 8-bit	8	1.2 + 3.3	24x24 mm QFP 0.5 mm pitch	Industrial	large 128 KB URAM	–
SH2A-FPU	7203	R5S72030W200FP	–	64K	99 / 240	2ch / 4ch / 4ch	2	1ch. H/S H+F	–	5 + 2 x 16-bit	RTC	10	200	–	–	✓	8 x 10-bit	2 x 8-bit	8	1.2 + 3.3	32x32 mm QFP 0.5 mm pitch	Industrial	FPU	R0K572030S000BE
	7201	DS72011RB120FPV	–	32K	123 / 176	- / 8ch / 3ch	2	–	–	5 + 2 x 16-bit	RTC	10	120	–	–	–	8 x 10-bit	2 x 8-bit	8	3.3	24x24 mm LQFP 0.5 mm pitch	Standard	FPU, SSI	R0K572011S001BE
		DS72011RW100FPV																				Industrial		
SH2A-FPU	7216	R5F72145BDFA#V1	512	64k	100 / 176	1ch / 5ch / 1ch	1	1ch. F/S F	–	6+3+2 x 16-bit	–	16	200	–	–	–	8 x 12-bit	–	8 + DTC	3.3 / 5	20×20 mm LQFP 0.4 mm pitch	Industrial	32 kB Dataflash	R0K572167S000BE
		R5F72146BDFA#V1	768	96 kB																				
		R5F72147BDFA#V1	1 MB	128 kB																				
		R5F72145BDFP#V1	512	64k					1												24×24 mm LQFP 0.5 mm pitch			
		R5F72146BDFP#V1	768	96 kB																				
		R5F72147BDFP#V1	1MB	128 kB																				
		R5F72145BDBG#U1	512	64k					1												13×13 mm BGA 0.8 mm pitch			
		R5F72146BDBG#U1	768	96 kB																				
		R5F72147BDBG#U1	1 MB	128 kB																				
		R5F72145ADFA#V1	512	64k					1												20×20 mm LQFP 0.4 mm pitch			
		R5F72146ADFA#V1	768	96 kB																				
		R5F72147ADFA#V1	1 MB	128 kB																				
		R5F72145ADFP#V1	512	64k					1												24×24 mm LQFP 0.5 mm pitch			
		R5F72146ADFP#V1	768	96 kB																				
		R5F72147ADFP#V1	1 MB	128 kB																				
		R5F72145ADBG#U1	512	64k					1												13×13 mm BGA 0.8 mm pitch			
		R5F72146ADBG#U1	768	96 kB																				
		R5F72147ADBG#U1	1 MB	128 kB																				
		R5F72165BDFA#V1	512	64k					–												20×20 mm LQFP 0.4 mm pitch		32 kB Dataflash	
		R5F72166BDFA#V1	768	96 kB																				
		R5F72167BDFA#V1	1 MB	128 kB																				
		R5F72165BDFP#V1	512	64k					–												24×24 mm LQFP 0.5 mm pitch			
		R5F72166BDFP#V1	768	96 kB																				
		R5F72167BDFP#V1	1 MB	128 kB																				
		R5F72165BDBG#U1	512	64k					–												13×13 mm BGA 0.8 mm pitch			
		R5F72166BDBG#U1	768	96 kB																				
		R5F72167BDBG#U1	1 MB	128 kB																				
SH2A-FPU	7216	R5F72165ADFA#V1	512	64k	100 / 176	1ch / 5ch / 1ch	1	1ch. F/S F	1	6+3+2 x 16-bit	–	16	200	–	–	–	8 x 12-bit	–	8 + DTC	3.3V / 5V	20×20 mm LQFP 0.4 mm pitch	Industrial	FPU + 32 kB Dataflash	R0K572167S000BE
		R5F72166ADFA#V1	768	96 kB																				
		R5F72167ADFA#V1	1 MB	128 kB																				
		R5F72165ADFP#V1	512	64k					1				200								24×24 mm LQFP 0.5 mm pitch			
		R5F72166ADFP#V1	768	96 kB																				
		R5F72167ADFP#V1	1 MB	128 kB																				
		R5F72165ADBG#U1	512	64k					1				200								13×13 mm BGA 0.8 mm pitch			
		R5F72166ADBG#U1	768	96 kB																				
		R5F72167ADBG#U1	1 MB	128 kB																				
		R5F72145HDFA#V1	512	64k					–				100								20×20 mm LQFP 0.4 mm pitch		32 kB Dataflash	
		R5F72146HDFA#V1	768	96 kB																				
		R5F72147HDFA#V1	1 MB	128 kB																				
		R5F72145HDFP#V1	512	64k					–				100								24×24 mm LQFP 0.5 mm pitch			
		R5F72146HDFP#V1	768	96 kB																				
		R5F72147HDFP#V1	1 MB	128 kB																				
		R5F72145HDBG#U1	512	64k					–				100								13×13 mm BGA 0.8 mm pitch			

Device			Memory		Interfaces					Timers & Other Peripherals											Miscellaneous Information			
Core	Nickname	Part Number	Size [kB]	RAM [Byte]	I/O /Pins	SPI/ UARTs/ I²C	CAN	USB	Ethernet	Timer Channels (8-bit/16-bit)	Special Timers	PWMs	Clock speed [MHz]	Internal Oscillator(s)	Subclock 32.768 kHz	TFT control	A/D / D/A-Converter	Analog Features	DMA	Supply Voltage [V]	Packages	Qualification	Other Features*	Starter Kit
SH2A-FPU	7216	R5F72146HDBG#U1	768	96kB	100 / 176	1ch / 5ch / 1ch	1	1ch. F/S F	1	6+3+2 x 16-bit	–	16	100	–	–	–	8 x 12-bit	–	8 + DTC	3.3V / 5V	13×13 mm BGA 0.8 mm pitch	Industrial	32kB Dataflash	ROK572167S000BE
		R5F72147HDBG#U1	1 MB	128kB																				
		R5F72145GDFA#V1	512	64k																	20×20 mm LQFP 0.4 mm pitch			
		R5F72146GDFA#V1	768	96kB					1															
		R5F72147GDFA#V1	1MB	128kB																				
		R5F72145GDFP#V1	512	64k																	24×24 mm LQFP 0.5 mm pitch			
		R5F72146GDFP#V1	768	96kB																				
		R5F72147GDFP#V1	1 MB	128kB					1															
		R5F72145GDBG#U1	512	64k																	13×13 mm BGA 0.8 mm pitch			
		R5F72146GDBG#U1	768	96kB					–															
		R5F72147GDBG#U1	1 MB	128kB																				
SH2A-FPU	7216	R5F72165HDFA#V1	512	64k	100 / 176	1ch / 5ch / 1ch	1	1ch. F/S F	–	6+3+2 x 16-bit	–	16	100	–	–	–	8 x 12-bit	–	8 + DTC	3.3 / 5	20×20 mm LQFP 0.4 mm pitch	Industrial	FPU + 32kB Dataflash	ROK572167S000BE
		R5F72166HDFA#V1	768	96kB																				
		R5F72167HDFA#V1	1 MB	128kB																	24×24 mm LQFP 0.5 mm pitch			
		R5F72165HDFP#V1	512	64k																				
		R5F72166HDFP#V1	768	96kB					–															
		R5F72167HDFP#V1	1 MB	128kB																				
		R5F72165HDBG#U1	512	64k																	13×13 mm BGA 0.8 mm pitch			
		R5F72166HDBG#U1	768	96kB					–															
		R5F72167HDBG#U1	1 MB	128kB																				
		R5F72165GDFA#V1	512	64k																	20×20 mm LQFP 0.4 mm pitch			
		R5F72166GDFA#V1	768	96kB					1															
		R5F72167GDFA#V1	1 MB	128kB																				
		R5F72165GDFP#V1	512	64k																	24×24 mm LQFP 0.5 mm pitch			
		R5F72166GDFP#V1	768	96kB					1															
		R5F72167GDFP#V1	1 MB	128kB																				
		R5F72165GDBG#U1	512	64k																	13×13 mm BGA 0.8 mm pitch			
		R5F72166GDBG#U1	768	96kB					1															
		R5F72167GDBG#U1	1 MB	128kB																				
SH2-A	7211	DF72115D160FPV	512k	32k	81 / 144	1ch / 4ch / 1ch	–	–	–	6+3+2 x 16-bit	6 + 3 + 2	16	160	–	–	–	8 x 12-bit	2 x 8-bit	8	1.2 + 3.3 + 5	20x20 mm QFP 0.5 mm pitch	Industrial	faster Flash, 12-bit ADC	R0K572115S001BE
	7286	R5F72865N100FP#U2	512k	24k	113 /176	1ch / 5ch / 1ch	1	1ch. F/S F	–	6+3+2 x 16-bit	–	16	100	–	–	–	12 x 12-bit	2 x 8-bit	8+ DTC	3.3 / 5	24x24 mm QFP 0.5 mm pitch	Standard	–	R0K572867S000BE
		R5F72865D100FP#U2																				Industrial		
		R5F72865N100FA#U2																			20x20 mm QFP 0.4 mm pitch	Standard		
		R5F72865D100FA#U2																				Industrial		
		R5F72866N100FP#U2	768k	32k																	24x24 mm QFP 0.5 mm pitch	Standard		
		R5F72866D100FP#U2																				Industrial		
		R5F72866N100FA#U2																			20x20 mm QFP 0.4 mm pitch	Standard		
		R5F72866D100FA#U2																				Industrial		
		R5F72867N100FP#U2	1 M																		24x24 mm QFP 0.5 mm pitch	Standard		
		R5F72867D100FP#U2																				Industrial		
		R5F72867N100FA#U2																			20x20 mm QFP 0.4 mm pitch	Standard		
		R5F72867D100FA#U2																				Industrial		
SH2-A	7285	R5F72855N100FP#U2	512k	24k	99 / 144	1ch / 5ch / 1ch	–	1ch. F/S F	–	6+3+2 x 16-bit	–	16	100	–	–	–	8 x 12-bit	–	8+ DTC	3.3 / 5	20x20 mm QFP 0.5 mm pitch	Standard	–	R0K572867S-000BE
		R5F72855D100FP#U2																				Industrial		
		R5F72856N100FP#U2	768k	32k																		Standard		
		R5F72856D100FP#U2																				Industrial		
	7243	R5F72433N100FP#U0	128k	8k	71 /100	- / 3ch / -	–	–	–	6+3+2 x 16-bit	–	16	100	–	–	–	8 x 12-bit	–	8+ DTC	3.3 / 5	14x14 mm LQFP 0.5 mm pitch	Standard	–	R0K572867S-000BE
		R5F72433D100FP#U0																				Industrial		
		R5F72434N100FP#U0	256k	12k																		Standard		
		R5F72434D100FP#U0																				Industrial		

Device			Memory		Interfaces				
Core	Nickname	Part Number	Size [kB]	RAM [Byte]	I/O /Pins	SPI/ UARTs/ I²C	CAN	USB	Ethernet
SH-2	7147	DF71476AK64FPV	512k	16k	57 / 100	1ch / 3ch / 1ch	1	–	–
		DF71476BD80FPV							
		DF71476BJ80FPV							
		DF71475AK64FPV	384k						
		DF71475BJ80FPV							
		DF71474AK64FPV	256k	12k					
		DF71474BD80FPV		16k					
		DF71474BJ80FPV							
		R5F71474BJ80FPV							
SH2A-FPU	7239	R5F72395AD160FPV	512k	64k	69 / 120	1ch / 4ch / -	1	–	–
		R5F72395BD100FPV							
		R5F72375AD160FPV							
		R5F72375AD100FPV							
		R5F72394AD160FPV	256k	32k					
		R5F72394BD100FPV							
		R5F72374AD160FPV							
		R5F72374AD160FPV							
SH-2	7142	DF71426AK64FPV	512k	16k	57 / 100	1ch / 3ch / 1ch	2	–	–
		DF71426BJ80FPV							
		DF71426BD80FPV							
		DF71424BJ80FPV	256k						
		DF71424AK64FPV		12k					
	7136	DF71364AN80FPV	256k	16k	60 /180	1ch / 3ch / 1ch	–	–	–
		DF71364AD80FPV							
	7137	DF71374AN80FPV	256k	16k	73 / 100	1ch / 3ch / 1ch	–	–	–
		DF71374AD80FPV							
	7146	DF71464AN80FPV	256k	8k	57	- / 3ch / -	–	–	–
		DF71464AD80FPV							
		ROM code dependant							
		ROM code dependant							
	7149	DF71464AN80FPV	256k	8k	75	- / 3ch / -	–	–	–
		DF71494AD80FPV							
		ROM code dependant							
		ROM code dependant							
		ROM code dependant							

Timers & Other Peripherals											Miscellaneous Information			
Timer Channels (8-bit/16-bit)	Special Timers	PWMs	Clock speed [MHz]	Internal Oscillator(s)	Subclock 32.768 kHz	TFT control	A/D / D/A-Converter	Analog Features	DMA	Supply Voltage [V]	Packages	Qualification	Other Features*	Starter Kit
6+3+2 x 16-bit	–	16	80	–	–	–	2x8x12-bit	–	DTC	3.3 / 5	14x14 mm LQFP 0.5 mm pitch	Automotive	–	–
												Industrial		
												Industrial		
												Automotive		
												Industrial		
												Automotive		
												Industrial		
												Industrial		
6+3+2 x 16-bit	–	16	160	–	–	–	16 x12-bit	–	DTC	3.3	16x16 mm LQFP 0.5 mm pitch	Industrial	FPU + 32 kB Dataflash	–
			100							5				
			160				2x8x12-bit			3.3			32 kB Dataflash	
			100							5				
			160							3.3			FPU + 32 kB Dataflash	
			100							5				
			160							3.3			32 kB Dataflash	
			100							5				
6+3+2 x 16-bit	–	16	80	–	–	–	2x8x12-bit	–	DTC	3.3 / 5	14x14 mm QFP 0.5 mm pitch	Industrial	–	–
												Automotive		
												Industrial		
												Industrial		
												Automotive		
6+3+2 x 16-bit	–	16	80	–	–	–	12 x 12-bit	–	DTC	3.3 / 5	14x14 mm QFP 0.5 mm pitch	Standard	–	R0K571374S-000BE
												Industrial		
6+3+2 x 16-bit	–	16	80	–	–	–	16 x 12-bit	–	DTC	3.3 / 5	14x14 mm QFP 0.5 mm pitch	Standard	–	
												Industrial		
6+3+2 x 16-bit	2x MC timer blocks, DTC	16	80	–	–	–	12 x 10-bit	–	DTC	5	14x14 mm LQFP 0.65 mm pitch	Standard	–	–
												Industrial		
												Standard		
6+3+2 x 16-bit	2x MC timer blocks, DTC	16	80	–	–	–	12 x 10-bit	–	DTC	5	14x14 mm QFP 0.5 mm pitch	Industrial	–	–
												Standard		
												Industrial		
												Standard		

Device			Memory		Interfaces					Timers & Other Peripherals											Miscellaneous Information			
Core	Nickname	Part Number	Size [KB]	RAM [Byte]	I/O /Pins	SPI/ UARTs/ I²C	CAN	USB	Ethernet	Timer Channels (8-bit/16-bit)	Special Timers	PWMs	Clock speed [MHz]	Internal Oscillator(s)	Subclock 32.768 kHz	TFT control	A/D / D/A-Converter	Analog Features	DMA	Supply Voltage [V]	Packages	Qualification	Other Features*	Starter Kit
SH-2	7125	DF71253N50FPV#Z1	128 k	8 k	45	- / 3ch / -	–	–	–	6+2 x 16-bit	–	14	50	–	–	–	2 x 4 x 10-bit	–	–	5	LQFP 0.8mm Pitch	Standard	–	R0K571242S001BE
		DF71253D50FPV#Z1																				Industrial		
		DF71253N50FAV#Z1																			QFP 0.5mm Pitch	Standard		
		DF71253D50FAV#Z1																				Industrial		
		DF71253N50NPV#Z1																			QFN 0.4mm Pitch	Standard		
		DF71253D50NPV#Z1																				Industrial		
		DF71252N50FPV#Z1	64 k																		LQFP 0.8mm Pitch	Standard		
		DF71252D50FPV#Z1																				Industrial		
		DF71252N50FAV#Z1																			QFP 0.5mm Pitch	Standard		
		DF71252D50FAV#Z1																				Industrial		
		DF71251AD50FAV	32 k																			Industrial		
		DF71251AD50FPV																			LQFP 0.8mm Pitch	Industrial		
		DF71251AD50NPV																			QFN 0.4mm Pitch	Industrial		
		DF71251AN50FAV																			QFP 0.5mm Pitch	Standard		
		DF71251AN50FPV																			LQFP 0.8mm Pitch	Standard		
		DF71251AN50NPV																			QFN 0.4mm Pitch	Standard		
		DF71250AD50FAV		4 k																	QFP 0.5mm Pitch	Industrial		
		DF71250AD50FPV																			LQFP 0.8mm Pitch	Industrial		
		DF71250AD50NPV																			QFN 0.4mm Pitch	Industrial		
		DF71250AN50FAV																			QFP 0.5mm Pitch	Standard		
		DF71250AN50FPV																			LQFP 0.8mm Pitch	Standard		
		DF71250AN50NPV																			QFN 0.4mm Pitch	Standard		
SH-2	7124	DF71243N50FPV#Z1	128 k	8 k	31	- / 3ch / -	–	–	–	6+2 x 16-bit	–	14	50	–	–	–	2 x 4 x 10-bit	–	–	5	LQFP 0.65 mm pitch	Standard	–	R0K571242S001BE
		DF71243D50FPV#Z1																				Industrial		
		DF71242N50FPV#Z1	64 k																			Standard		
		DF71242D50FPV#Z1																				Industrial		
		DF71242N50NPV#Z1																			QFN 0.4 mm pitch	Standard		
		DF71242D50NPV#Z1																				Industrial		
		DF71241N50FPV	32 k																		LQFP 0.65 mm pitch	Standard		
		DF71241D50FPV																				Industrial		
		DF71241N50NPV																			QFN 0.4 mm pitch	Standard		
		DF71241D50NPV																				Industrial		
		DF71240AD50FPV	16 k	4 k																	LQFP 0.65 mm pitch	Standard		
		DF71240AD50NPV																				Industrial		
		DF71240AN50FPV																			QFN 0.4 mm pitch	Standard		
		DF71241D50NPV																				Industrial		

SHP

Device			Memory		Interfaces					Timers & Other Peripherals											Miscellaneous Information			
Core	Nickname	Part Number	Size [KB]	RAM [Byte]	I/O /Pins	SPI/ UARTs/ I²C	CAN	USB	Ethernet	Timer Channels (8–bit/16–bit)	Special Timers	PWMs	Clock Speed [MHz]	Internal Oscillator(s)	Subclock 32.768 kHz	TFT control	A/D / D/A–Converter	Analog Features	DMA	Supply Voltage [V]	Packages	Qualification	Other Features*	Starter Kit
SH3-DSP	SH7712	HD6417712BP	32K unified Cache	16K	256-pin	2 SCIF 2 SIOF	–	–	2ch 10/100 Mbps (with Bridge)	–	3 x 32-bit timer blocks (TMU)	6	200 MHz 260 MIPS	–	–	–	–	–	E-DMAC x 4	1.5 (int.) 3.3 (I/O)	256-pin BGA 17 x 17 mm 0.8 pitch	Std.	DSP, E-DMAC x 4	–
		HD6417712F																			256-pin QFP 28 x 28 mm 0.4 pitch			
	SH7713	HD6417713BP	32K unified Cache	16K	256-pin	2 SCIF 2 SIOF	–	–	1ch 10/100 Mbps	–	3 x 32-bit timer blocks (TMU)	6	200 MHz 260 MIPS	–	–	–	–	–	E-DMAC x 2	1.5 (int.) 3.3 (I/O)	256-pin BGA 17 x 17 mm 0.8 pitch	Std.	DSP, E-DMAC x 2	–
		HD6417713F																			256-pin QFP 28 x 28 mm 0.4 pitch			
SH-4A	SH7723	R8A77230C400BG	32K (instr.) 32K (data) 256K (L2 cache)	16K 128K (high speed)	449-pin	6 SCIF 2 SPI I²C IrDA	–	1 USB 2.0 Select. Host/ Function (high speed support)	–	4 x 16-bit (TPU)	7 x 32-bit timer blocks 6 (TMU) 1 (CMT)	21	400 MHz 720 MIPS, 2.8 GFLOPS	–	–	✓	10-bit x 4 / –		12	1.2 (int.) 3.3 (I/O)	449-pin BGA 21 x 21 mm 0.8 pitch	Std.	Floating Point Unit Video processing unit (VPU) for enc/dec MPEG-4 and H.264 with 30fps@D1 Video I/O (VIO) with 5Mpix camera I/F, Video output unit(VOU), TS (transport stream) interface, High performance 2D graphic acceralator	emtrion
		R8A77230D400BG																				Ind.		
SH-4A	SH7724	R8A77240D500BG	32K (instr.) 32K (internal) 256K L2	18K SRAM 128K MERAM	449-pin	6 SCI 2 I²C 2 MSIOF	–	2 select. Host/ Function Highspeed/Full-speed/Lowspeed	1 ch 10/100 Mbit	4 x 16-bit (TPU)			500 Mhz/ 900MIPS, 3.5 GFLOPS	–	–	✓	–		12	1.15 -1.30 (int.) 1.65-1.95 or 2.7-3.6 (I/O)	449-pin BGA 21x21 mm 0.8 pitch	Ind.	Floating Point Unit Video Processing Unit (VPU) for enc/dec MPEG-4 and H.264 with 30fps@720p 2x Video IO with 5 Mpix Camera I/F, Video output unit (VOU), TS (transport stream interface), High performance 2D graphics accelerator	emtrion
	SH7763	R5S77630AY266BGV	32K (instr.) 32K (data)	16K	449-pin	3 SCIF 3 SIOF 2 I²C	–	1 select. Host/ Function (full speed support)	2ch 10/100/ 1000 Mbps (Gbit)	4 x 16-bit timers (CMT)	6 x 32-bit timer blocks (TMU)	16	266 MHz 478 MIPS, 1.8 GFLOPS	–	–	✓	10-bit x 4 / 8-bit x 2	–	6	1.25 (int.) 3.3 (I/O) 2.5 (DDR)	449-pin BGA 21 x 21 mm 0.8 pitch	Std.	IP sec.accelerator, HAC, Stream interface Floating Point Unit	–
		R5S77631AY266BGV																					HAC, Stream interface Floating Point Unit	
		R5S77632AY266BGV																					IP sec.accelerator, HAC, Stream interface Floating Point Unit	
	SH7764	R5S77640N300BG	32K (instr.) 32K (data)	16K	404-pin	3 SCIF 1 I²C	–	1 USB 2.0 Select. Host/ Function (high speed support)	1ch 10/100 Mbps	–	6 x 32-bit timer blocks (TMU)	12	324 MHz 583 MIPS, 2.3 GFLOPS	–	–	✓	–	–	12	1.2 (int.) 3.3 (I/O)	404-pin BGA 19 x 19 mm 0.8 pitch	Std.	High performance 2D graphic acceralator + display unit Floating Point Unit ATAPI	–
		R5S77640P300BG																				Ind.	Floating Point Unit ATAPI	
	SH7780	R8A77800	32K (instr.) 32K (data)	16K (high-speed) 32K (medium-speed)	449-pin	2 SCIF 1 SIOF 1 SPI	–	–	–	4 x 16-bit timers (CMT)	6 x 32-bit timer blocks (TMU)	16	400 MHz 720 MIPS, 2.8 GFLOPS	–	–	–	–	–	12	1.25 (int.) 3.3 (I/O) 2.5 (DDR)	449-pin BGA 21 x 21 mm 0.8 pitch	Std. Ind.	HAC Floating Point Unit MMC, SSI	emtrion
SH-4A	SH7785	R8A77850A	32K (instr.) 32K (data)	8K (high-speed) 16K (high-speed) 128K (medium-speed)	436-pin	6 SCIF 1 SIOF 1 SPI	–	–	–	–	6 x 32-bit timer blocks (TMU)	12	600 MHz 1080 MIPS, 4.2 GFLOPS	–	–	Display unit	–	–	12	1.1 (int.) 3.3 (I/O) 1.8 (DDR2)	436-pin BGA 19 x 19 mm 0.8 pitch	Std. Ind.	HAC Floating Point Unit MMC, SSI	emtrion
ARM Cortex A9	EM EV2	µPD77642BF1-GA9-A	32K (instruction) 32 (internal) 256K L2 cache 64KB ROM	128KB	393-pin	6ch USI / SPI 4ch UART 1ch I_2C 2ch SDIO	-	1ch USB Host 1ch USB Func.	-	14ch 32bit 1ch 32bit WDT	-	14	533MHz	-	-	Display unit 2D + 3D graphics H.264 / MPEG4/ VC1 @1080p decode	-	-	8ch	1.1V (internal) 1.8,3.3V (I/O)	393-pin FPBGA 16 x 16 mm 0.65 mm	Standard	High performance 2D graphic acceralator + display unit Floating Point Unit ATAPI	N/A

SH7239F

SH2A CPU Core
> 160MHz = 384DMIPS
> 100MHz = 240DMIPS
> 2 instructions executed per clock tick
> Integrated FPU

On Chip memory
> 512kB-256kB MONOS Flash
> 64kB-32kB on chip RAM
> BSC for external Memory 40/50MHz 16bit
> 32kB DataFlash

Analogue
> ADC: 2x8ch 12bit – 1.0us Conversion time

Connectivity
> 1 x RSPI
> 4 x SCI(F)
> 1x CAN (RCAN-ET)

Timers
> MTU2 – 6ch 16bit timer for Motor Control
> MTU2S – 3ch 16bit timer for Motor Control
> CMT – 2ch 16bit timer
> Watchdog Timer

Other
> 8ch DMA
> Data Transfer Controller (DTC)

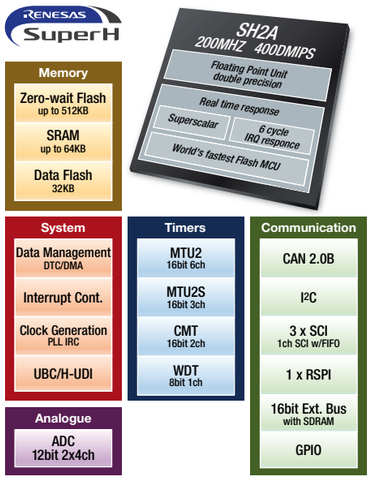
Debug
> UBC with 2 break channels
> H-UDI for JTAG

Digital I/O
> 91-101 I/O pins (+ 8-12 input only)

Power Supply Voltage
> 5.0V +/- 0.5V for Analogue
> 5.0V +/- 0.5V OR 3.3V +/- 0.3V for I/O

Packages
> LQFP-120 (16 x 16 mm², 0.5 mm pitch)

Temperature ranges
-40 -> +85°C



SH7216F

SH2A CPU Core
> 200MHz = 480DMIPS
> 2 instructions executed per clock tick
> Integrated FPU

On Chip Memory
> 1M-512kB MONOS Flash
> 128-64kB on chip RAM
> BSC for external Memory 50MHz 32bit
> 32kB DataFlash

Analogue
> ADC: 2x4ch 12bit – 1.0us Conversion time

Connectivity
> 1 x RSPI
> 5 x SCI(F)
> 1 x IIC
> 1x CAN (RCAN-ET)
> 1x Ether MAC with EDMAC 10/100
> 1x USB Full Speed Function

Timers
> MTU2 – 6ch 16bit timer for Motor Control
> MTU2S – 3ch 16bit timer for Motor Control
> CMT – 2ch 16bit timer
> Watchdog Timer

Other
> 8ch DMA
> Data Transfer Controller (DTC)

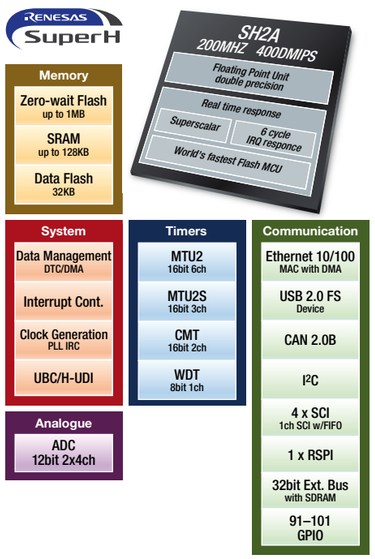
Debug
> UBC with 2 break channels
> H-UDI for JTAG
> Advanced User Debug

Digital I/O
> 91-101 I/O pins (+ 8-12 input only)

Power Supply Voltage
> 5.0V +/- 0.5V for Analogue
> 3.3V +/- 0.3V for I/O

Packages
> LQFP-176 (20 x 20 mm², 0.4 mm pitch)
> LQFP-176 (24 x 24 mm², 0.5 mm pitch)
> BGA 176 (13 x 13 mm², 0.8 mm pitch)

Temperature ranges
-40 -> +85°C



SH726A/6B

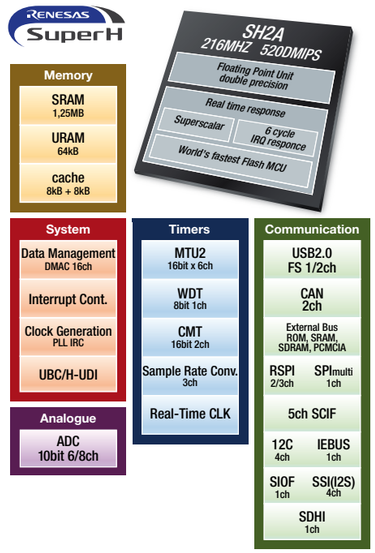
> **CPU** SH2A-FPU (SuperH RISC engine)
> **Frequency** CPU 216 MHz / External Bus 72 MHz (Max)
> **Power** Internal 1.15 to 1.35V / External 3.3V

Internal Memory
- URAM: 64 Kbyte
- SRAM: 1.25 Mbyte
(includes standby RAM: 256 KB)

External Memory Interface
- BUS Width 8bit or 16bit
SRAM, NOR Flash, PCMCIA

Peripheral
- DMAC : 16 ch
- USB Host/Function FullSpeed : 1 / 2 ch
- Multi Function Timer (MTU2) : 5 ch
- 16bit Timer (CMT) : 2 ch
- Watch Dog Timer (WDT) : 1 ch
- Real Time Clock (RTC) : 1 ch
- I²C bus I/F : 4 ch
- Serial Communication I/F with FIFO (SCIF) : 5 ch
- Renesas Serial Peripheral I/F (RSPI) : 2 / 3 ch
- SPI Multi I/O Bus Controller (SPI Multi) : 1 ch
- Serial Sound Interface (SSI) : 4 ch
- SPDIF : 1 ch
- Sampling Rate Converter (SRC) : 3 ch
- CDROM Decoder
- 10bit A/D Converter : 6 / 8 ch
- SD Card Host IF (SDHI) : 1 ch
- RCAN : 2 ch (Option)
- IEBus : 1 ch

SH726A: 120pin QFP (0.5mm Pitch/0.4mm Pitch)
SH726B: 144pin QFP (0.5mm Pitch)



SH7266 and SH7267 in Detail

High Efficient 32bit CPU Core
> 144 MHz CPU Clock Frequency
> 2 Execution Units delivering 356 Dhrystone MIPS

Single and Double Floating Point Unit compliant with IEEE754
> Accelerates e.g. trigonometric operations like rotation

High-Density up to 1.5 MByte internal RAM
> 1 Bus cycle access time

Support for Booting from SPI Flash Memory and NAND Flash Memory
> New Approach, lot of SRAM instead of FLASH
> External SPI serial flash is extremly cheap compared to onChip Flash
> Very flexible: 128Kbit - 512Mbit serial Flash

LCD Controller VGA and 16bit interface
> 2 Layers available for overlaying image over image
> alpha blending

CMOS Camera Sensor Interface
> 8bit @ 27 MHz
> ITU.BT 601/650 (PAL/NTSC)

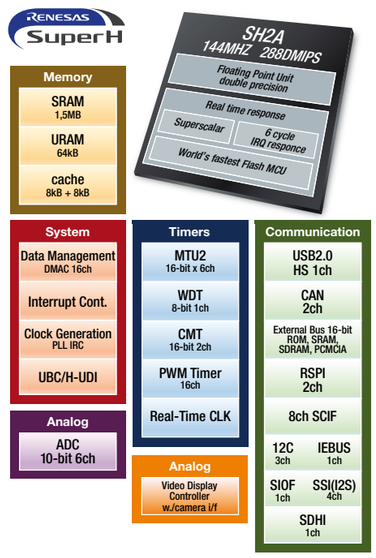
Bus Interface Controller for glue less connection of
> SRAM, SDRAM, NOR Flash Memory
> 16KB cache

USB 2.0 Host and Function Controller with integrated USB Transceiver

Up to 2 CAN channels

Low Current Consumption
> Normal operation: Typ 60 mA
> Sleep mode: Typ 35 mA
> Standby mode: Typ 1 mA
> Deep standby mode: Typ 3 uA

Package
> 144-pin QFP (SH7266)
> 176-pin QFP (SH7267)



SH7268 and SH7269 in Detail

High Efficient 32bit CPU Core
> 266 MHz CPU Clock Frequency
> 2 Execution Units delivering 640 Dhrystone MIPS

Single and Double Floating Point Unit compliant with IEEE754
> Accelerates e.g. trigonometric operations like rotation

High-Density up to 2.5 MByte internal RAM
> 1 Bus cycle access time

2D-Graphics Engine (RGPVG): OpenVG 1.1
> Full support for Khronos OpnVG1.1 API
> Reendering, Animation and Acceleration OpenVG w/o CPU

Support for Booting from QSPI Flash Memory and NAND Flash Memory
> New Approach. lot of SRAM instead of FLASH
> External SPI serial flash is extremly cheap compared to onChip Flash
> Very flexible: 128Kbit - 512Mbit serial Flash

LCD Controller VGA with 24bit interface
> 3 layers overlay
> Dot and window Alpha Blending
> Chroma Keying

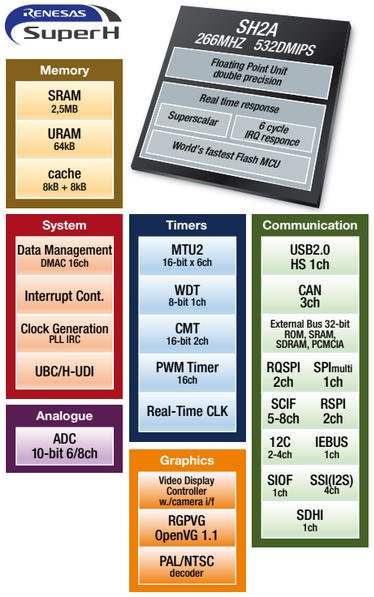
CMOS Camera Sensor Interface
> 8bit @ 27 MHz
> ITU.BT 601/650 (PAL/NTSC)

Bus Interface Controller for glue less connection of
> SRAM, SDRAM, NOR, NAND, eMMC Flash Memory
> 16KB cache

USB 2.0 Host and Function Controller with integrated USB Transceiver

Up to 3 CAN channels

Package
> SH7268 208-pin QFP (0.5 mm)
> SH7269 272-pin BGA (0.8mm) /256-pin QFP (0.4mm)



SH7724 – Leading Edge Multimedia + Connectivity

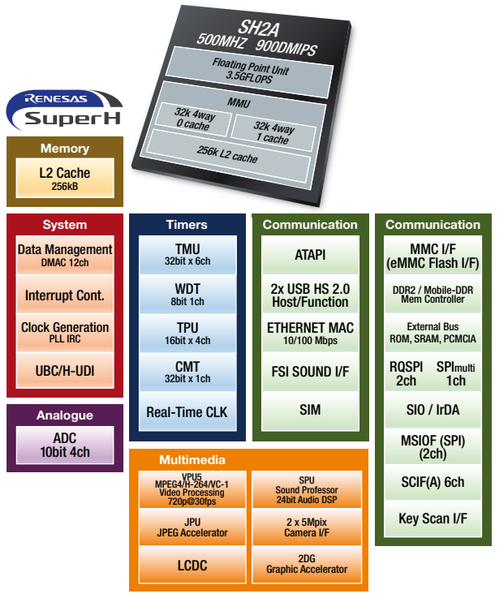
SH4A-FPU CPU Core @ 500MHz
> 900 DMIPS + 3.5 GFLOPS FPU
> 64kB L1 Cache + 256kB L2 Cache

DDR2 / Mobile-DDR
> 333Mhz up to 512Mbytes

Multimedia Support
> VPU5F - Video Codec Engine
  – H.264 / MPEG4 / VC-1
  – 720p video processing @30fps
  – Two-stream video enc/dec
> JPU - JPEG Codec Engine
> SPU2 - (24bit Audio DSP)

Peripherals / Connectivity
> LCDC : 16/18/24bit RGB and YUV + VOU: 1ch
> 2DG : High performance 2D rendering engine
> SDHI : 2ch for (CPRM Option)
> MMC4.2 : 1ch (CE-ATA/NAND Flash I/F)
> USB2.0 HS : 2ch (2ch Host or 1ch Function)
> Ethernet MAC : 1ch 10/100base

Package
> BGA 449 (21 x 21 x 1.9 mm, 0.8 mm pitch)



EM/EV2 – dual ARM CA-9 and Full HD decode

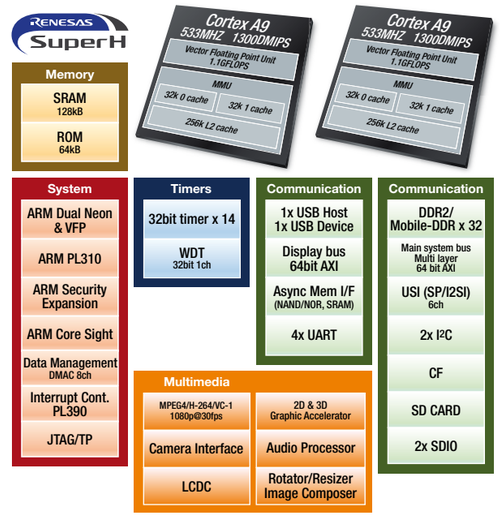
Dual Cortex A9 Core @ 533MHz
> 2600 DMIPS, Neon ext + VFP
> 32/32 I/D Cache + 256kB L2 cache

> DDR2 / Mobile-DDR support
> 333Mhz up to 512Mbytes

Multimedia Support
> 1080P30 video decode
> Integrated audio engine
> SGX530 graphic HW accelerator

Peripherals / Connectivity
> LCDC : 16/18/24bit RGB and YUV
> 2DG : High performance 2D rendering engine
> 3x SDIO, 1x SDCARD : 2ch (CPRM Option)
> eMMC, NAND and NOR Flash support
> USB PHY (1x Host, 1x Device)

Package
> BGA 393 (16 x 16 x 1.41 mm, 0.65 mm pitch)



SH7785 – Pentium Class CPU/FPU Performance - 1080DMIPS / 4.2 GFLOPS + PCI, DDR2, LCDC -

SH-4A CPU Core @ 600MHz
> 1080 DMIPS + 4.2 GFLOPS FPU

DDR2-SDRAM interface
> DDR2-600 (300Mhz),DDR2-400 (200Mhz)
> 256 Mbit, 512 Mbit, 1 Gbit and 2 Gbit

3 external bus system
> DDR2-SDRAM, PCI, Local Bus

PCI controller (PCI 2.2)

FLCTL (NAND Flash I/F)

SCIF (6ch), SIOF (1), SPI (1), MMC I/F

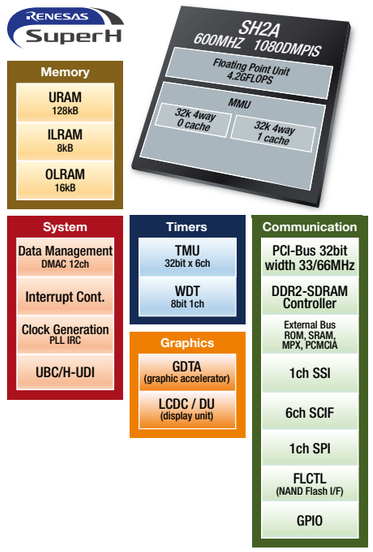
SSI (1ch) – Serial Sound I/F

GDTA – Graphics Data Translation Accelerator
> YUV translation, motion compensation processing

LCDC / DU – Display Unit
> Display Unit with up to 6 planes, RGB output

Package
> BGA 436 (19 x 19 mm, 0.8 mm pitch)

Key Feature: High system performance
> Superscalar SH-4A CPU/FPU
> External 3 bus system and enhanced internal bus enabling high system performance
> PCI and serial I/Fs for conectivity + Display



Tools

Renesas Starter Kit (RSK)

The kit includes:

- CPU board with target microcontroller
- LCD panel for user/diagnostic interaction
- E10 on-chip debugger
- Trial C compiler and IDE
- Tutorial session
- Sample peripheral driver code

High-performance Embedded Workshop

Renesas has developed a fully integrated development environment known as High-performance Embedded Workshop (HEW). HEW pulls together all of the development tasks into one easy-to-use application.

- Code development
- Project management
- Integrated debugger
- Compiler integration
- Flash programmer

Emulator line up
A range of emulators is available for the SuperH family, ranging from the low-cost E8 Flash programmer up to the E200F tool, integrating all the real-time trace required for an application. All RSKs now come with an 'E10A lite – for starterkits' as standard.

A wide range of boards and operating systems supported for all SuperH devices

SuperH controllers
These are supported by a wide range of real-time operating systems from a number of different suppliers, as well as Linux.

SuperH processors
These are supported by a wide range of real-time operating systems from a number of different suppliers, as well as Linux.

Renesas and its alliance partners offer complete system solutions. It is acknowledged that an important part of any product development is the early availability of development boards, operating systems and even application software.
As such, Renesas and alliance partners have developed scalable development board solutions ranging from generalpurpose boards for device evaluation to more comprehensive application specific boards for prototypes, and end-application developments up to complete reference systems for specific markets or applications.

The SuperH architecture, through its long history and leadership in the embedded market, has a wide range of support on the market among leading operating system vendors. With the ever-increasing popularity of Embedded Linux, the SuperH processors are supported by a great open source community. In addition, there are board support packages available for the major commercial operating systems like Windows Embedded, QNX, VxWorks.

emtrion GmbH
System Integrator Services
Official Partner of MS, QNX
Offers starter kits.

IVREA SISTEMI Sri
System Integrator Services
Renesas MCU/MPU experience.

TES
GUI Design House
GUI Dev. tools: Giulliani

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

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