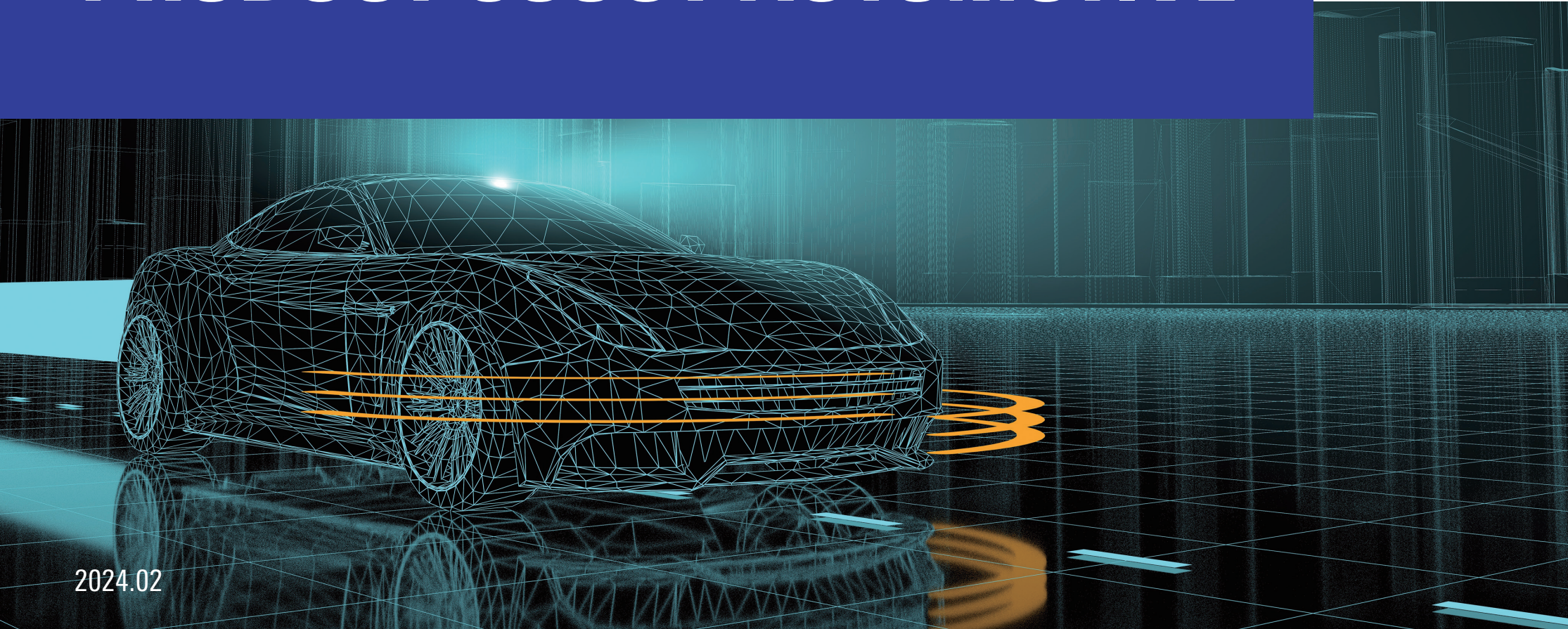


PRODUCT SCOUT AUTOMOTIVE

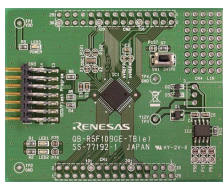


AUTOMOTIVE MICROCONTROLLERS

Series	Nickname/Group	Part number	Flash size [B]	RAM [B]	Data flash [B]	Core	FPU	I/O lines	CS/UART/LIN	CAN/CAN-FD	IPC	External buses	Other interfaces	Timing channels (10/16/32-bit)	PWMs	Clock speed (MHz)	Internal oscillator(s)	Subclock [Hz]	A/D converter / D/A converter	Supply voltage (V)	Pins	Packages	T _{max} [°C]	Other features
F Series	RL78/F12	RSF0988	8 K	0.5 K		RL78	-	16	2/3/1	1	0/-	-	-	-/9/-	4	32	1x 15 kHz 32 MHz	-	4x 10-bit/-	1.8..5.5	20	PLSP0020JC-A	85, 125	DMA, LVD, POR
		RSF098A	16 K	1 K																				
		RSF098B	24 K	1.5 K																				
		RSF098C	32 K	2 K																				
		RSF098D	48 K	3 K																				
		RSF098E	64 K	4 K																				
		RSF098A	16 K	1 K																				
		RSF098B	24 K	1.5 K																				
		RSF098C	32 K	2 K																				
		RSF098D	48 K	3 K																				
		RSF098E	64 K	4 K																				
		RSF099A	16 K	1 K																				
		RSF099B	24 K	1.5 K																				
		RSF099C	32 K	2 K																				
		RL78/F13-LIN	RL78/F13-LIN	RSF10A6A	16 K									1 K					RL78					
RSF10A6C	32 K			2 K																				
RSF10A6D	48 K			3 K																				
RSF10A6E	64 K			4 K																				
RSF10AAA	16 K			1 K																				
RSF10AAC	32 K			2 K																				
RSF10AAD	48 K			3 K																				
RSF10AAE	64 K			4 K																				
RSF10ABA	16 K			1 K																				
RSF10ABC	32 K			2 K																				
RSF10ABD	48 K			3 K																				
RSF10ABE	64 K			4 K																				
RSF10AGA	16 K			1 K																				
RSF10AGC	32 K			2 K																				
RSF10AGD	48 K			3 K																				
RSF10AGE	64 K	4 K																						
RSF10AGF	96 K	6 K																						
RSF10AGG	128 K	8 K																						
RSF10ALC	32 K	2 K																						
RSF10ALD	48 K	3 K																						
RSF10ALE	64 K	4 K																						
RSF10ALF	96 K	6 K																						
RSF10ALG	128 K	8 K																						
RSF10AME	64 K	4 K																						
RSF10AMF	96 K	6 K																						
RSF10AMG	128 K	8 K																						
RL78/F13-CAN	RL78/F13-CAN	RSF10BAC	32 K	2 K		RL78	-	26	3/3/1	3	1/-	-	-	-/21/-	11	32	2x 15 kHz 32 MHz	-	12x 10-bit/-	2.7..5.5	30	PLSP0030JB-A	105, 125, 150	DTC, LVD, MCT, POR
		RSF10BAD	48 K	3 K																				
		RSF10BAE	64 K	4 K																				
		RSF10BAF	96 K	6 K																				
		RSF10BAG	128 K	8 K																				
		RSF10BBC	32 K	2 K																				
		RSF10BBD	48 K	3 K																				
		RSF10BBE	64 K	4 K																				
		RSF10BBF	96 K	6 K																				
		RSF10BBG	128 K	8 K																				
		RSF10BGC	32 K	2 K																				
		RSF10BGD	48 K	3 K																				
		RSF10BGE	64 K	4 K																				
		RSF10BGF	96 K	6 K																				
		RSF10BGG	128 K	8 K																				
RSF10BLC	32 K	2 K																						
RSF10BLD	48 K	3 K																						
RSF10BLE	64 K	4 K																						
RSF10BLF	96 K	6 K																						
RSF10BLG	128 K	8 K																						
RSF10BME	64 K	4 K																						
RSF10BMF	96 K	6 K																						
RSF10BMG	128 K	8 K																						
RSF10PAD	48 K	4 K																						
RSF10PAE	64 K	6 K																						
RSF10PBD	48 K	4 K																						
RSF10PBE	64 K	6 K																						
RSF10PBG	48 K	4 K																						
RSF10PGE	64 K	6 K																						
RSF10PGF	96 K	8 K																						
RSF10PGG	128 K	10 K																						
RSF10PGH	192 K	16 K																						
RSF10PGJ	256 K	20 K																						
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RSF10PME	64 K	6 K																						
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RSF10PMG	128 K	10 K																						
RSF10PMH	192 K	16 K																						
RSF10PMJ	256 K	20 K																						
RSF10PPE	64 K	6 K																						
RSF10PPF	96 K	8 K																						
RSF10PPG	128 K	10 K																						
RSF10PPH	192 K	16 K																						
RSF10PPJ	256 K	20 K																						
RL78/F15	RL78/F15	RSF1130K	384 K	26 K		RL78	-	44	4/4/2	2/-	5/-	-	IEBus	-/25/-	15	32	2x 15 kHz 32 MHz	-	18x 10-bit / 1x 8-bit	2.7..5.5	48	PVON0048KG-A PLOG0048KF-A	105, 125	CMP, DTC, ELC, LVD, MCT, POR
		RSF1130L	512 K	32 K																				
		RSF1130M	768 K	48 K																				
		RSF1130N	1024 K	64 K																				
		RSF1130K	384 K	26 K																				
		RSF1130L	512 K	32 K																				
		RSF1130M	768 K	48 K																				
		RSF1130N	1024 K	64 K																				
		RSF1130K	384 K	26 K																				
		RSF1130L	512 K	32 K																				
		RSF1130M	768 K	48 K																				
		RSF1130N	1024 K	64 K																				
		RSF1130K	384 K	26 K																				
		RSF1130L	512 K	32 K																				
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RSF1130L	512 K	32 K																						

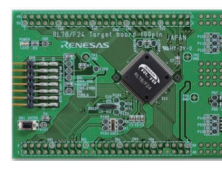
RL78/F1x Target Boards

- For RL78/F1x evaluation
- Equipped with
 - RL78/F12, RL78/F13, RL78/F14 or RL78/F15
 - 14-pin debugging and programming interface
 - CAN & LIN interface
 - 4 or 20 MHz main clock resonator
 - switch, 2 LEDs
 - breadboard area (2.54 mm pitch)
- Board dimensions: approx. 109 mm x 56 mm
- Order codes:
 - QB-R5F109GE-TB (RL78/F12)
 - QB-R5F10BGM-TB (RL78/F13)
 - QB-R5F10PPJ-TB (RL78/F14)
 - Y-QB-R5F113TL-TB-V2 (RL78/F15)



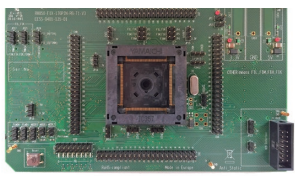
RL78/F2x Target Boards

- For RL78/F2x evaluation
- Equipped with
 - RL78/F24
 - 14-pin debugging and programming interface
 - CAN & LIN interface
 - 4 or 20 MHz main clock resonator
 - switch, 2 LEDs
 - breadboard area (2.54 mm pitch)
- Board dimensions: approx. 109 mm x 56 mm
- Order codes:
 - TKF7F24FPC01000B-J (RL78/F24)



RH850 Evaluation Platform – F1Kx Adapter Boards

- For RH850/F1K and F1Kx evaluation
- To be used in combination with the RH850 Evaluation Platform main boards or stand-alone operation
- Equipped with
 - Burn-in socket to adapt RH850/F1Kx devices
 - pin headers for direct access to all microcontroller I/O pins
 - 8 Signal LEDs
 - Reset circuit, Oscillator circuit
 - 14-pin debug and flash programming connector
- Board dimensions: 160 mm x 100 mm
- Package includes CD with user's manual and schematic
- Order codes:
 - Y-RH850-F1X-048PIN-PB-T1-V1 (RH850/F1KM-S1, 48 pin)
 - Y-RH850-F1X-064PIN-PB-T1-V1 (RH850/F1KM-S1, 64-pin)
 - Y-RH850-F1X-080PIN-PB-T1-V1 (RH850/F1KM-S1, 80-pin)
 - Y-RH850-F1X-100PIN-PB-T1-V3 (RH850/F1K, F1KM-S1/-S4, 100-pin)
 - Y-RH850-F1X-144PIN-PB-T1-V3 (RH850/F1K, F1KM-S4, 144-pin)
 - Y-RH850-F1X-176PIN-PB-T1-V4 (RH850/F1K, F1KM-S4, F1KH-D8 176-pin)
 - Y-RH850-F1X-233PIN-PB-T2-V1 (RH850/F1KM-S4, F1KH-D8, 233-pin)
 - Y-RH850-F1X-324PIN-PB-T1-V1 (RH850/F1KH-D8, 324-pin)



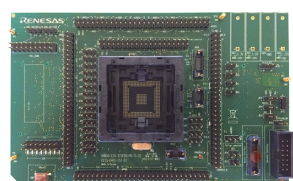
RH850 Evaluation Platform - P1M-E, P1x-C Adapter Boards

- For RH850/P1M-E and P1x-C evaluation
- To be used in combination with the RH850 Evaluation Platform main boards or stand-alone operation
- Equipped with
 - Burn-in socket to adapt RH850/P1M-E, P1x-C devices
 - pin headers for direct access to all microcontroller I/O pins
 - 8 Signal LEDs
 - Reset circuit, Oscillator circuit
 - 14-pin debug and flash programming connector
- Board dimensions: 160 mm x 100 mm
- Package includes CD with user's manual and schematic
- Order codes:
 - Y-RH850-P1X-100PIN-PB-T1-V2 (RH850/P1M-E, 100-pin, 0.5 mm p. p.)
 - Y-RH850-P1X-144PIN-PB-T1-V2 (RH850/P1M-E, 144-pin, 0.4 mm p. p.)
 - Y-RH850-P1X-080PIN-PB-T1-V1 (RH850/P1x-C, 80-pin, 0.4 mm p. p.)
 - Y-RH850-P1X-100PIN-PB-T1-V1 (RH850/P1x-C, 100-pin, 0.4 mm p. p.)
 - Y-RH850-P1X-144PIN-PB-T1-V1 (RH850/P1x-C, 144-pin, 0.4 mm p. p.)
 - Y-RH850-P1X-156PIN-PB-T1-V1 (RH850/P1x-C, 156-pin)
 - Y-RH850-P1X-292PIN-PB-T1-V2 (RH850/P1x-C, 292-pin)
 - Y-RH850-P1X-404PIN-PB-T1-V2 (RH850/P1x-C Emulation Device supporting AURORA Trace)



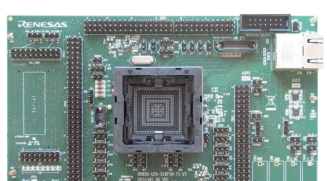
RH850 Evaluation Platform - E2x Adapter Boards

- For RH850/E2x evaluation
- To be used in combination with the RH850 Evaluation Platform or stand-alone operation
- Equipped with
 - Burn-in socket to adapt RH850/E2x devices
 - pin headers for direct access to all microcontroller I/O pins
 - 8 Signal LEDs
 - Reset circuit, Oscillator circuit
 - 14-pin debug and flash programming connector
- Board dimensions: 160 mm x 100 mm
- Package includes CD with user's manual and schematic
- Order codes:
 - Y-RH850-E2X-292PIN-PB-T1-V2 (RH850/E2M, 292-pin)
 - Y-RH850-E2X-373PIN-PB-T1-V3 (RH850/E2M, E2H, E2UH, 373-pin)
 - Y-RH850-E2X-468PIN-PB-T1-V1 (RH850/E2H, E2UH, 468-pin)



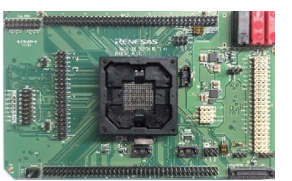
RH850 Evaluation Platform - U2A Adapter Boards

- For RH850/U2A evaluation
- To be used in combination with the RH850 Evaluation Platform or stand-alone operation
- Equipped with
 - Burn-in socket to adapt RH850/U2A devices
 - pin headers for direct access to all microcontroller I/O pins
 - 8 Signal LEDs
 - Reset circuit, Oscillator circuit
 - Gigabit Ethernet interface
 - 14-pin debug and flash programming connector
- Board dimensions: 160 mm x 100 mm
- Package includes CD with user's manual and schematic
- Order codes:
 - Y-RH850-U2A-144PIN-PB-T1-V1 (RH850/U2A6, 144-pin)
 - Y-RH850-U2A-156PIN-PB-T1-V1 (RH850/U2A6, 156-pin)
 - Y-RH850-U2A-176PIN-PB-T1-V1 (RH850/U2A6, 176-pin)
 - Y-RH850-U2A-292PIN-PB-T1-V2 (RH850/U2A6, RH850/U2A8, RH850/U2A16, 292-pin)
 - Y-RH850-U2A-373PIN-PB-T1-V1 (RH850/U2A8, RH850/U2A16, 373-pin)
 - Y-RH850-U2A-516PIN-PB-T1-V1 (RH850/U2A16, RH850/U2A-EVA, 516-pin)



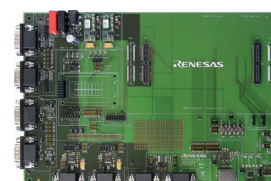
RH850 Evaluation Platform - U2B Adapter Boards

- For RH850/U2B evaluation
- To be used in combination with the RH850 Evaluation Platform or stand-alone operation
- Equipped with
 - Burn-in socket to adapt RH850/U2B devices
 - pin headers for direct access to all microcontroller I/O pins
 - 8 Signal LEDs
 - Reset circuit, Oscillator circuit
 - RHSIF, RH5B, and MSPi onboard interface connectors
 - 46-pin Aurora Debug Connector (46-pin to 14-pin adapter included)
- Board dimensions: 160 mm x 100 mm
- Package includes CD with user's manual and schematic
- Order codes:
 - Y-RH850-U2B-292PIN-PB-T1-V1 (RH850/U2B6, 292-pin)



RH850/x1x Evaluation Platform Main Board - Type 1

- For RH850 evaluation
- To be used in combination with MCU-specific Adapter Boards
- Equipped with
 - various interfaces/connectors:
 - 2 CAN, 2 LIN,
 - FlexRay (2 channels)
 - Ethernet
 - 2 UART/RS232, 2 SENT, 2 PSiS
 - 4 Signal LEDs (active high), 3 push buttons, 3 analogue inputs
 - LCD Module, breadboard area
- Board dimensions: 260 mm x 174 mm
- Package includes CD with user's manual and schematic
- Order code:
 - Y-RH850-X1X-MB-T1-V1



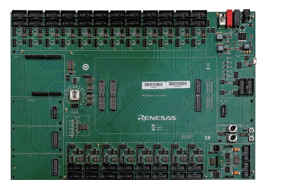
RH850/x1x Evaluation Platform Main Board - Type 2

- For RH850 evaluation
- To be used in combination with MCU-specific Adapter Boards
- Equipped with
 - various interfaces/connectors:
 - 8 CAN-FD, 16 LIN,
 - FlexRay (2 channels)
 - Ethernet (selectable for either for BroadR-Reach or RJ45)
 - 2 UART/RS232
 - 4 Signal LEDs (active high), 3 push buttons, 2 analogue inputs
 - 2.8" TFT touch display, breadboard area
- Board dimensions: 272 mm x 206 mm
- Package includes CD with user's manual and schematic
- Order codes:
 - Y-RH850-X1X-MB-T2-V1
 - Y-RH850-TFT-EXT-BRD (optional TFT Display)



RH850/x2x Evaluation Platform Main Board

- For RH850 evaluation
- To be used in combination with MCU-specific Adapter Boards
- Equipped with
 - various interfaces/connectors:
 - 16 CAN-FD, 24 LIN,
 - FlexRay (2 channels)
 - Ethernet (2 channels)
 - SENT (2 channels)
 - 2 UART/RS232
 - 20 Signal LEDs (active high), 2 push buttons, 2 analogue inputs
 - Interface connector for 2.8" TFT touch display
- Board dimensions: 324 mm x 222 mm
- Package includes CD with user's manual and schematic
- Order codes:
 - Y-RH850-X2X-MB-T1-V1
 - Y-RH850-TFT-EXT-BRD (optional TFT Display)



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SYSTEM ON CHIP

Series	Nickname/Group	Part number	Core	FPU	Clock Speed [MHz]	GPU	GPU Clock Speed [MHz]	DDR-Interface	Flash Interface	Video Output	Video Input	External bus	High Speed Interface	CAN/CAN FD	Ethernet 100 Mbit/1 Gbit	USB	MLB	SPI	UART	IPC	Pins	Packages	Tj, max [°C]	Other features
R-Car Gen3e	R-Car H3e	R8A779M0	4x Cortex A57 4x Cortex A53 Cortex R7	✓	1700 1200 800	PowerVR - GX6650 D/AVE-HD	600	4x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS 2x HDMI	2x Digital 3x MIPI-CS12	✓	2x PCIe SATA	2/2	-/1	3.0 4x 2.0	3-pin MOST50	4	11	7	1384	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car H3e-2G	R8A779M1	4x Cortex A57 4x Cortex A53 Cortex R7	✓	2000 1200 800	PowerVR - GX6650 D/AVE-HD	600	4x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS 2x HDMI	2x Digital 3x MIPI-CS12	✓	2x PCIe SATA	2/2	-/1	3.0 4x 2.0	3-pin MOST50	4	11	7	1384	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car H3Ne	R8A779M8	4x Cortex A57 4x Cortex A53 Cortex R7	✓	1500 1200 800	PowerVR - GX6650 D/AVE-HD	600 266	2x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS HDMI	2x Digital 2x MIPI-CS12	✓	2x PCIe SATA	2/2	-/1	3.0 2x 2.0	3-pin MOST50	4	11	7	1022	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car H3e-2G	R8A779M1	4x Cortex A57 4x Cortex A53 Cortex R7	✓	2000 1200 800	PowerVR - GX6650 D/AVE-HD	600	4x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS 2x HDMI	2x Digital 2x MIPI-CS12	✓	2x PCIe SATA	2/2	-/1	3.0 4x 2.0	3-pin MOST50	4	11	7	1384	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car M3e	R8A779M2	2x Cortex A57 4x Cortex A53 Cortex R7	✓	1800 1300 800	PowerVR - GX6250 D/AVE-HD	700	2x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS HDMI	2x Digital 2x MIPI-CS12	✓	2x PCIe	2/2	-/1	3.0 2x 2.0	3-pin MOST50	4	11	7	1022	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car M3e-2G	R8A779M3	4x Cortex A57 4x Cortex A53 Cortex R7	✓	2000 1300 800	PowerVR - GX6250 D/AVE-HD	700	2x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS HDMI	2x Digital 2x MIPI-CS12	✓	2x PCIe	2/2	-/1	3.0 2x 2.0	3-pin MOST50	4	11	7	1022	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car M3Ne	R8A779M4	2x Cortex A57 Cortex R7	✓	1800 800	PowerVR - GE7800 D/AVE-HD	700 400	1x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS HDMI	2x Digital 2x MIPI-CS12	✓	2x PCIe SATA	2/2	-/1	3.0 2x 2.0	3-pin MOST50	4	11	7	1022	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car M3Ne-2G	R8A779M5	2x Cortex A57 Cortex R7	✓	2000 800	PowerVR - GE7800 D/AVE-HD	700 400	1x 32-bit LPDDR4-3200	Parallel Serial Flash Raw NAND 2x eMMC 4x SPIO	Digital Out LVDS HDMI	2x Digital 2x MIPI-CS12	✓	2x PCIe SATA	2/2	-/1	3.0 2x 2.0	3-pin MOST50	4	11	7	1022	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
	R-Car E3e	R8A779M6	2x Cortex A53 Cortex R7	✓	1200 800	PowerVR - GE8300 D/AVE-HD	600 400	2x 16-bit DDR3(L)-1866	Parallel Serial Flash Raw NAND 1x eMMC 3x SPIO	Dig. Out / LVDS LVDS	2x Digital MIPI-CS12	✓	PCIe	2/2	-/1	3.0 2x 2.0	3-pin MOST50	4	11	8	552	BGA	125	Audio DSP, Security, Safety, Video HW codec, Image Processor, Timers, WDT, PWMs
R-Car D3e	R8A779M7	1x Cortex A53	✓	1000	PowerVR - GE8300 D/AVE-HD	600 400	1x 16-bit DDR3(L)-1866	Raw NAND Serial Flash 1x eMMC	Dig. Out / LVDS LVDS	1x Digital	-	-	2/2	-/1	2.0	3-pin MOST50	4	8	4	401	BGA	125	Security, Safety, Image Processor, Timers, WDT, PWMs	

Series	Nickname/Group	Part number	CPU system	Clock Speed [MHz]	SRAM [MiB]	Memory I/F	High Speed Interface	CAN FD	Ethernet 100 Mbit/2.5 Gbit	FlexRay	LIN	UART	IPC	ASIL level	Package	Other features
R-Car Gen4	R-Car S4-8	R8A779F4	8x Cortex A55 1x Cortex R52 2x RH850 G4MH	1200 1000 400	8	LPDDR4x-3200 (ECC Corrected) 32bit (=> 12.8 GB/s) 2x OSPI 1x HyperFlash Serial NOR Flash I/F (OCTAL FLASH) eMMC 5.01	2x PCIe V4.0 (2 lanes)	16	1 AVB/3x Gbit TSN + swit	1	16	4	7	D	FCBGA 780 0.8mm pitch	HSM, crypto core Communication IP H/W acceleration Enhanced power management features LV PMIC RAA271005 HV PMIC RAA271041 Timing IC RC21212 JTAG debug I/F
	R-Car S4N-8	R8A779F5	8x Cortex A55 1x Cortex R52 2x RH850 G4MH	1200 1000 400	8	LPDDR4x-3200 (ECC Corrected) 32bit (=> 12.8 GB/s) 2x OSPI 1x HyperFlash Serial NOR Flash I/F (OCTAL FLASH) eMMC 5.01	2x PCIe V4.0 (2 lanes)	16	1 AVB/3x Gbit TSN + swit	-	16	4	5	D	FCBGA 780 0.65mm pitch	HSM, crypto core Communication IP H/W acceleration Enhanced power management features LV PMIC RAA271006 HV PMIC RAA271041 Timing IC RC21212 JTAG debug I/F
	R-Car S4-4	R8A779F6	4x Cortex A55 1x Cortex R52 2x RH850 G4MH	1200 1000 400	8	LPDDR4x-3200 (ECC Corrected) 32bit (=> 12.8 GB/s) 2x OSPI 1x HyperFlash Serial NOR Flash I/F (OCTAL FLASH) eMMC 5.01	2x PCIe V4.0 (2 lanes)	16	1 AVB/3x Gbit TSN + swit	-	16	4	5	D	FCBGA 780 0.8mm pitch	HSM, crypto core Communication IP H/W acceleration Enhanced power management features LV PMIC RAA271005 HV PMIC RAA271041 Timing IC RC21212 JTAG debug I/F
	R-Car S4N-4	R8A779F7	4x Cortex A55 1x Cortex R52 2x RH850 G4MH	1200 1000 400	8	LPDDR4x-3200 (ECC Corrected) 32bit (=> 12.8 GB/s) 2x OSPI 1x HyperFlash Serial NOR Flash I/F (OCTAL FLASH) eMMC 5.01	2x PCIe V4.0 (2 lanes)	16	1 AVB/3x Gbit TSN + swit	-	16	4	5	D	FCBGA 780 0.65mm pitch	HSM, crypto core Communication IP H/W acceleration Enhanced power management features LV PMIC RAA271006 HV PMIC RAA271041 Timing IC RC21212 JTAG debug I/F

Series	Nickname	Part number	Real Time Core Freq / KDMIPS	Application Core	GPU / Frequency	Computer Vision / Frequency	Deep Learning (TOPS)	Other Accel.	Video Codec	Audio Codec	DDR Interface	Flash Interface	Video Input	Video Output	High Speed Interface	Auto I/F	Ethernet 100Mbit/1Gbit	ASIL	Pins / Package	Other Features
R-Car V3x	R-Car V3M	R8A77970	CR7 Lockstep 800MHz/2k DMIPS	2x CA53 800MHz/3.6k DMIPS	No	2CvE / 400MHz	0.3 TOPs	1x ISP, 4x IMR	H.264 Enc	No	32bit DDR3L-1600	2x OSPI	1x MIPI-CS12 (4L) 2x Digital Vin TTL	1x DU 1x LVDS (OpenLDI) 1x Digital Vout TTL	No	2x CAN 2.0B/FD, FlexRay	1x Gbit AVB	Up to ASIL B	FCBGA 0.8mm 419 balls	4x UART 4x SPI 5x I2C Security JTAG
	R-Car V3H	R8A77980A	CR7 Lockstep 800MHz/2k DMIPS	4x CA53 1GHz/9.2k DMIPS	No	5CvE / 533MHz	3.7 TOPs	2x ISP, 5x IMR, 1x SMD, 1x STV, 5x ACF	H.264 Enc	No	32bit LPDDR4-3200	2x OSPI 1x eMMC	2x MIPI-CS12 (4L) 2x Digital Vin TTL	1x DU 1x LVDS (OpenLDI) 1x Digital Vout TTL	1x PCIe 2.0	3x CAN 2.0B/FD, FlexRay	1x Gbit AVB 1x Gbit Std port	Up to ASIL C	FCBGA 0.8mm 538 balls	4x UART 6x SPI 7x I2C Security JTAG
	Evaluation versions of the tools and sample software can be downloaded from website: www.renesas.com/Y-ASK-RH850F1KM-S4-V3																			

Series	Nickname	Part number	Real Time Core Freq / KDMIPS	Application Core	GPU / Frequency	Computer Vision / Frequency	Deep Learning (TOPS)	Other Accel.	Video Codec	Audio Codec	DDR Interface	Flash Interface	Video Input	Video Output	High Speed Interface	Auto I/F	Ethernet 100Mbit/1Gbit	ASIL	Pins / Package	Other Features
R-Car V4x	R-Car V4H	R8A77980LAB18A	3x CR52 Lockstep 1.4GHz	4x CA76 1.8GHz	AXM-R256 600MHz	4x Computer Vision Engine	34 TOPs	2x ISP, 5x IMR, 1x SMD, 1x DOF, 4x DSP	H.264 Enc./ H.264 Codec	No	64-bit LPDDR5-6400 LPDDR4-4266	2x OSPI 1x eMMC	2x MIPI-CS12	2x DU 2x MIPI CS12/ DSI-output	2x PCIe 4.0	8x CAN 2.0B/FD, FlexRay	3x Gbit AVB, 1x Gbit TSN	Up to ASIL -0	FCBGA 1135 pins 0.65mm pitch 25x25mm	4x UART 6x SPI 7x I2C I2S Security JTAG
	R-Car V4M	R8A779811LB18A	3x CR52 Lockstep 1.4GHz	4x CA76 1 GHz	BXS-4-64 1GHz	4x Computer Vision Engine	17 TOPs	1x ISP, 5x IMR, 1x SMD, 1x DOF, 2x DSP	H.264 Enc.	No	32-bit LPDDR5-6400 LPDDR4x-4266	2x OSPI 1x eMMC	2x MIPI-CS12	1x DU 1x MIPI CS12/ DSI-output	1x PCIe 4.0	4x CAN 2.0B/FD, FlexRay	3x Gbit AVB	Up to ASIL -0	FCBGA 729 pins 0.65mm pitch 19x19mm	4x UART 6x SPI 4x I2C I2S Security JTAG

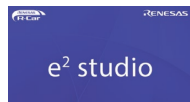
Other features: CvE Computer Vision Engine DU Display Unit ISP Image Signal Processor STV Stereo Vision
 DOF Dense Optical Flow IMR Image Rectifier SMD Simple Instruction Multiple Data WDT Window Watchdog Timer

TOOLS

SOFTWARE TOOLS

R-Car e² Studio

- e² Studio is a complete, state of the art development environment supporting Renesas R-Car V series based on an Open Source Eclipse CDT
- Complete environment available to download, included in the R-Car SDK package.
- Supports R-Car V3x, R-Car V4H and the corresponding Evaluation boards and starter kits running embedded linux.
- Includes:
 - » HSSTP high speed Trace for ARM cores
 - » ADAS plug-ins: "Debug Trace Agent" for computer vision hardware accelerators, Bus Traffic Monitoring, image Viewer, Pin configurator.
 - » Support the Computer Vision simulators
- For more information refer to: www.renesas.com/software-tool/e-studio-r-car



R-Car CNN toolchain

- Network conversion from Caffe or ONNX model to binary for efficient execution on R-Car Gen3 CNN architecture
- Easy to use through single line command & GUI support
- Support for various R-Car V3x architectures through single click option
- Manual & automatic execution optimisation features to maximise efficiency
- Support for programmable layers on Renesas CVe architecture for flexibility
- Seamless integration with ONNX Runtime on ARM CPUs for wide ONNX networks execution
- Built-in 16-bit & 8-bit quantization capabilities
- Support for SIL & HIL
- Windows & Linux support
- Integrated within R-Car SDK

SOFTWARE

R-Car SDK

R-Car Software Development Kit: Easy to start, easy to access, easy to use, easy to develop. It includes:

- » Development tools, Simulation platform
- » Target libraries
- » Sample code and Documentation

Multiple variants of the R-Car SDK are available:

- R-Car SDK Linux reference package:
 - » Available under ELA on renesas.com for R-Car V3x and S4, V4H
- R-Car SDK certified:
 - » ASIL Target Libraries are compiled with certified compiler.
 - » OS dependent package. Please contact Renesas for more information.

Autosar MCAL



- Standard Peripheral Abstraction Layer (SPAL) drivers, communication drivers and test drivers
- For AUTOSAR AR4.X based MCAL for Cortex R
- Worldwide support infrastructure with interface for 1st and 2nd level support in Europe
- Cooperation with various BSW/OS vendors and integrators
- Flexible mass-production licenses
- Free-of-charge development licenses for up to 500 prototypes

Security Software

- Renesas provides a variety of software for implementing strong security functions, such as:
- » secure boot functions that prevent modifications to programs;
 - » security level management functions that correspond to the product lifetime; and trusted execution environments.
 - » enables OTA updating, which allows application and OS upgrades without the driver having to return to the car dealer.
 - » Renesas plans to sequentially roll out a variety of security software packages to respond to system structures and needs, and to support the hypervisor.

CR7 SDK

- R-Car CR7 Software Development Kit: reference solution for Easy To Start on CR7. It includes:
- » FreeRTOS CR7 SW:
 - » BSP
 - » 2D Gfx libraries
 - » Video decoders
 - » Virtio based inter-processor communication driver (Linux on CA5x).
- Please contact Renesas for more information.

R-Car S4 Whitebox SDK

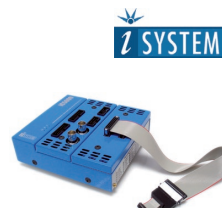
- The R-Car S4 Whitebox SDK is an integrated development platform that accelerates the development of connected services applications.
- » All software is provided under a FoC license for easy testing
 - » This is replaceable with rich software solutions from the RCC partner ecosystem of over 255 companies
 - » R-Car S4 Whitebox SDK provides the OS/framework layer, allowing users to focus on developing value-added applications for the product
 - » Provides experience through sample applications for various use cases
 - » All software are customizable as it consists mainly of open source.
 - » Hypervisor support for MCUs
 - » RTOS based on AUTOSAR specifications

Renesas is working closely with multiple partners in order to extend the software offer and support customer requirements. From OS vendors to system integration. For more information refer to the Renesas consortium WebPage: [R-Car Consortium Partners | Renesas](http://www.renesas.com/consortium)

3RD PARTY EMULATORS

ISYSTEM

- Universal emulator and debugger system:
 - » On-chip debugging for RL78, RH850 and R-Car
 - » In-Circuit Emulation of RL78
 - » On-Chip and Off-Chip Trace (Parallel and AURORA) for RH850
 - » Off-Chip HSSTP Trace for R-Car
 - » Support for common compiler platforms
 - » Software API for 3rd party tools and test automation
 - » For more information visit www.isystem.com



Lauterbach

- Universal debugger system TRACE32™
 - » On-chip debugging for RL78, RH850 and R-Car
 - » On-Chip and Off-Chip Trace (Parallel and AURORA) for RH850
 - » Off-Chip HSSTP Trace for R-Car
 - » Support for common compiler platforms
 - » Software API for 3rd party tools and test automation
 - » For more information visit www.lauterbach.com



STARTER KITS

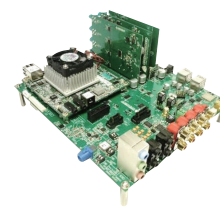
R-Car Starter Kit Premier (R-Car H3e-2G)

- Equipped with
 - » 1384-pin R-Car H3 device on SIP module
 - » 8 GB LPDDR4-3200 SDRAM
 - » 64 MB QSPI flash
 - » 128 GB eMMC
 - » Ethernet, Micro SD, USB, Micro HDMI display out
 - » Add. interfaces & SOC signals via COM Express connector (440-pin)
 - » JTAG interface
- Package includes
 - » Starter Kit
 - » Power supply
 - » USB and HDMI cable
- Software
 - » Linux BSP / MMP / Graphics Libraries available
- Order codes: Y-ASK-RCAR-H3E-8GB-WS30 / RTP8J779M1ASKB0SK0SA003 Y-SICA20I2P (JTAG Debug Adapter)



Kingfisher Expansion Board (R-Car H3/M3)

- For R-Car H3/M3 evaluation
- Expansion board to be used in combination with the R-Car H3/M3 starter kit board
- Equipped with
 - » Wireless & Automotive network connectivity [Wi-Fi, Bluetooth, 2x CAN-FD]
 - » 2ch display output (1x HDMI, 1x LVDS)
 - » SD Card, USB2.0/3.0, Mini PCIe
 - » 7.1 Audio output, Video input, CSI camera I/F, FM/AM radio
 - » JTAG debug connector
- Software
 - » Linux BSP / MMP / Graphics Libraries available
- Board dimensions: 180 mm x 198 mm
- Order codes: Y-SBEV-RCAR-KF-M06 (Kingfisher Advanced Carrier Board) Y-SBEV-RCAR-KF-GMSL02 (4 port GMSL camera input option-board)



R-Car V3M Starter Kit

- Equipped with :
 - » R-Car V3M
 - » 2 Gbytes DDR3L-1600
 - » 64 Mbytes Hyper Flash
 - » 64 Mbytes QSPI Flash
 - » 16GBytes eMMC
 - » HDMI, RGB, LVDS, MipiCSI2,
 - » EthernetAVB, Can-FD, I²C,
 - » JTAG, Debug Interface
 - » On board Connector with SOC signals
- Package include
 - » Starter Kit
 - » Power Supply
 - » USB& HDMI Cable
- Software
 - » Linux BSP (Linux.Org)
 - » Configuration tools
 - » Mimi Monitor
- Order codes: Y-ASK-RCAR-V3M-WS20 (with Rohm PMIC) Y-ASK-RCAR-V3M-WS20-REV2 (with Renesas PMIC)



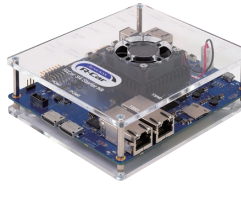
R-Car V3H Starter Kit

- Equipped with :
 - » R-Car V3H2
 - » 2 Gbytes DDR3L-1600
 - » 64 Mbytes Hyper Flash
 - » 64 Mbytes QSPI Flash
 - » 16GBytes eMMC
 - » HDMI, RGB, LVDS, MipiCSI2
 - » EthernetAVB, B-Ethernet, Can-FD, I²C
 - » JTAG, Debug Interface
 - » On board Connector with SOC signals
- Package include
 - » Starter Kit
 - » Power Supply
 - » USB& HDMI Cable
- Software
 - » Linux BSP (Linux.Org)
 - » Configuration tools
 - » Mimi Monitor
- Order codes: Y-ASK-RCAR-V3H-WS21 (with Renesas PMIC)



R-Car S4 Starter Kit

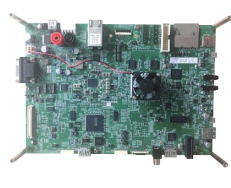
- Simplifies the process of establishing open-source automotive Linux environments.
- The R-Car starter kits are designed to simplify the task of setting up automotive Linux environments for engineers who are new to the development of automotive software, and are competitively priced so that each developer can be provided with their own kit.
- Eight 1.2 GHz Cortex A55 cores, one 1.0 GHz Cortex® R52 dual core (lock-step) and two 400 MHz RH850 G4MH dual cores (lock-step) deliver up to 27 kDMIPS application performance plus greater than 5.3 kDMIPS real-time performance.
- Ethernet TSN x 2
- CAN FD x2, LIN x 1
- 128GiB UFS
- 64MiB Quad SPI flash memory
- Order codes: Y-ASK-RCAR-S4-1000BASE-T



EVALUATION BOARDS

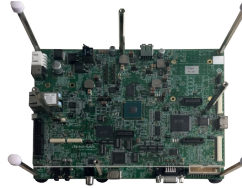
R-Car E3 Development Board "EBISU"

- For R-Car E3
- Equipped with:
 - » R-Car E3
 - » 64 MB NOR Flash Memory
 - » 2GB DDR3L-DRAM-1866
 - » 32GB eMMC
 - » USB 3.0/2.0, LAN
 - » 2ch display output (1x HDMI, 1-2x LVDS, 1x Analog RGB)
 - » HDMI and CVBS video input
 - » Audio Output and Microphone Input
 - » JTAG debug/trace connector
- Board dimensions: 230mm x 160mm
- Package includes CD with user's manual, schematic and boot software
- Order code: Y-R-CAR-E3-BOARD-DEV-WS11 / RTPORC77990SEB0020SA00



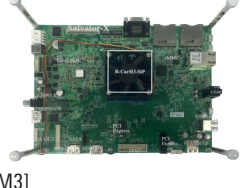
R-Car D3 Development Board "DRAAK"

- For R-Car D3
- Equipped with:
 - » R-Car D3
 - » 64 MB NOR Flash Memory
 - » 512MB DDR3L-SDRAM-1866
 - » 16GB eMMC
 - » USB 2.0, LAN
 - » 2ch display output (1x HDMI, 1-2x LVDS, 1x Analog RGB)
 - » HDMI and CVBS video input
 - » JTAG debug/trace connector
- Board dimensions: 210mm x 160mm
- Package includes CD with user's manual, schematic and boot software
- Order code: Y-R-CAR-D3-BOARD-DEV-WS11 / RTPORC77990SEB0010S



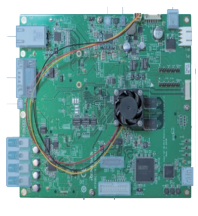
R-Car H3/M3/M3N Development Board "SALVATOR-XS"

- For R-Car H3, M3 and M3N
- Equipped with:
 - » R-Car H3/M3/M3N SIP
 - » 64 MB NOR Flash Memory
 - » 8GB LPDDR4-DRAM-3200 [H3 and M3] or 2GB LPDDR4-DRAM-3200 [M3N]
 - » 32GB eMMC
 - » USB 3.0/2.0, SD, LAN, SATA, PCIe
 - » 3-4ch Display output (1-2x HDMI, 1x LVDS, 1x Analog RGB)
 - » JTAG debug/trace connector
- Board dimensions: 210mm x 160mm
- Package includes CD with user's manual, schematic and boot software
- Order codes:
 - » Y-R-CAR-M3N-SIP-BOARD-SKT-ES20 / RTPORC77965SIPB012S-S
 - » Y-R-CAR-M3W-8GB-BOARD-SKT-WS30 / RTPORC77965SIPB0012SS5A
 - » Y-R-CAR-H3-8GB-BOARD-SKT-WS30 / RTPORC7795SIPB0012S-S03
 - » Y-R-CAR-M3NE-2GB-BRD-DEV-WS11 / RTP8J779M5ASKB0SLOSA103 (with soldered M3Ne-2G)
 - » Y-R-CAR-M3WE-8GB-BRD-DEV-WS30 / RTP8J779M3ASKB0SLOSA103 (with soldered M3e-2G)
 - » Y-R-CAR-H3E-8GB-BRD-DEV-WS30 / RTP8J779M1ASKB0SLOSA103 (with soldered H3e-2G)



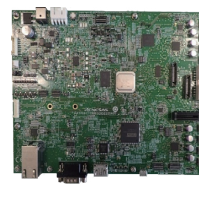
R-Car V3M Development Board "EAGLE"

- Equipped with:
 - » NOR flash memory
 - » Two serial NOR flash memory devices for QSPI0
 - » Serial NOR flash memory device for QSPI1
 - » SDRAM :
 - » LPDDR3-SDRAM for DBSC4
 - » Display interfaces :
 - » HDMI output connector for LVDS
 - » Video input interfaces :
 - » 4 camera input connectors for CSI2 channel 0
 - » Network interfaces:
 - » Gigabit Ethernet (GbE) connector for EthernetAVB
 - » CAN connector for CANFD0
 - » Peripheral interfaces:
 - » "Debug Serial" connector for SCIF0
 - » Debugger interfaces:
 - » 20-pin JTAG connector
 - » HSSTP connector for LVDS
 - » Peripheral connectors:
 - » Four EXIO connectors for DPAD, VIN0, MMC, and other modules
 - » Power supply: 12.0-V DC input
 - » Operating temperature : +25 degrees C at ambient temperature
 - » Order Code: Y-R-CAR-V3M-BOARD-DEV-ES20 / RTP8A77970ASKB0EG0SA001#WS



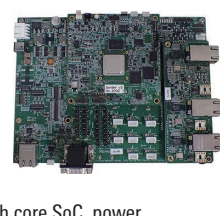
R-Car V3H Development Board "CONDOR-I"

- Equipped with:
 - » NOR flash memory:
 - » Two serial NOR flash memory devices for QSPI0,
 - » Serial NOR flash memory for QSPI1
 - » SDRAM :
 - » LPDDR4-SDRAM for DBSC4
 - » Display interface:
 - » HDMI output connector for LVDS
 - » Video input interfaces :
 - » camera input connectors for CSI2 channel 0
 - » camera input connectors for CSI2 channel 2
 - » Storage interface:
 - » eMMC memory for MMC
 - » Network interfaces:
 - » PCIe x 4 connectors (2 lanes) for PCIe
 - » Ethernet AVB PHY connector for EthernetAVB
 - » Gigabit Ethernet (GbE) connector for GETHER
 - » CAN connector for CANFD0_A
 - » Peripheral interfaces:
 - » "Debug Serial" connector for SCIF0 or HSCIF0_B
 - » Debugger interfaces:
 - » 20-pin JTAG connector for JTAG1
 - » 20-pin JTAG connector for JTAG2
 - » HSSTP connector through LVDS
 - » HSSTP connector through PCIe0
 - » Peripheral connectors:
 - » Three EXIO connectors for DPAD, GETHER (RMII), Flex Ray, VIN0, and other modules
 - » Power supply: 12.0-V DC input
 - » Operating temperature: +25 degrees C at ambient
 - » Package includes CD with User's Manual, Schematic and boot software
 - » Order Code: Y-RCAR-V3H-CONDOR-I-BRD-WS20 / RTPORC77980SEBS012SA01



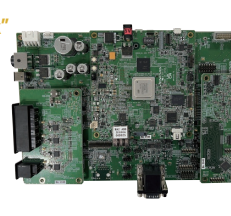
R-Car S4 Reference Board "Spider"

- Features
 - » Reduces the board size and BoM costs through MCU core integration into R-Car SoC, and use a single board to control both MCU domain and application SoC domain, which previously required separately.
 - » The reference board consists of a CPU board with core SoC, power management IC (PMIC) and memory, and an interface board, enabling support for a variety of networks.
 - » Supports 16 channels of CAN FD (can be used as 16 channels of LIN and 8 channels of SENT by multi-function), 2 channels of FlexRay, 2 channels of PCIe V4.0 x2 lanes, and 3 channels of 5G-USXGMII for Ethernet.
 - » The core system is realized by integrating the R-Car S4, LPDDR4x-3200 memory and HyperFlash™ memory on the CPU board, which contributes to shortening the time to market by simplifying the design.
 - » The combination of pre-regulators and PMICs developed for R-Car S4 can provide various supply voltages to meet functional safety requirements up to ASIL D in accordance with ISO 26262.
 - » Order Code: RTP8A779F0ASKB0SP2S



R-Car V4H Development Board "White Hawk"

- Equipped with:
 - » NOR flash memory:
 - » Serial NOR flash memory (64 MB) device for QSPI0
 - » HYPERFLASH™ memory device (64 MB) for QSPI0 and QSPI1
 - » SDRAM:
 - » LDDR5 – 6400, 8 GB, 64-bit, 1 module
 - » Display interface:
 - » 2x eDP (mini display port connector) for DSI0 and DSI1
 - » 2x GMSL2 output (FAKRA) for DSI0 and DSI1
 - » Video input interfaces:
 - » 2x GMSL2 input (Quad HFM FAKRA) for CSI0-1 via C-PHY
 - » Storage interfaces: eMMC memory (32GB)
 - » Network interfaces:
 - » OcuLink connector for PCIe0 and PCIe1 (4 lanes)
 - » Gigabit Ethernet (GbE) connector for Ether AVB0
 - » 3x Ethernet AVB + 1x Ethernet TSN ports (MATEnet) for EtherAVBx and EtherTSN0
 - » 2 FlexRay connectors for FlexRay A and FlexRay B
 - » Peripheral interfaces: Debug serial connector for SCIF0/HSCIF0
 - » Debugger interfaces: 20-pins JTAG connector for JTAGx
 - » Peripheral connectors:
 - » EX-SPI connector for QSPI0
 - » 2 break-out board connected (EXIO connectors A and B)
 - » Ethernet sub-board connector
 - » CSI and DSI sub-board connector
 - » Mode switch-board connector
 - » Power supply: 12.0-V DC inputs for mother board or 5V for CPU board only
 - » Operating temperature: +25 degrees C at ambient
 - » Package includes CD with User's Manual, Schematic and boot software
 - » Order Code: Y-RCAR-V4H-WHITEHAWK-BRD-WS10 / RTP8A779G0ASKB0FS0SA000

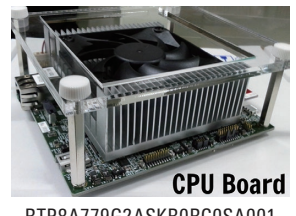


New all in one board:



RTP8A779G0ASKB0F10SA100

CPU board:

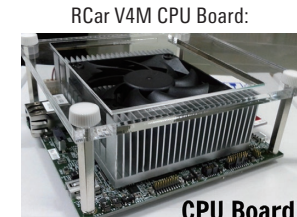


RTP8A779G2ASKB0RC0SA001

[V4H] White Hawk CPU Board (3rd lot) | [B-Car] EC site of Evaluation Board for R-Car Products (bcart.jp)

R-Car V4M Development Board "Grey Hawk"

- RTP8A779H0ASKB0F10SA001
- Info available at: www.renesas.com/us/en/document/mat/r-car-v4m-evaluation-boards
- [V4M] Gray Hawk All in 1 Board 00 [1st Lot] | [B-Car] EC site of Evaluation Board for R-Car Products (bcart.jp)



RTP8A779H0ASKB0RC0SA001

CPU Board (CPU) | [B-Car] EC site of Evaluation Board for R-Car Products (bcart.jp)



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