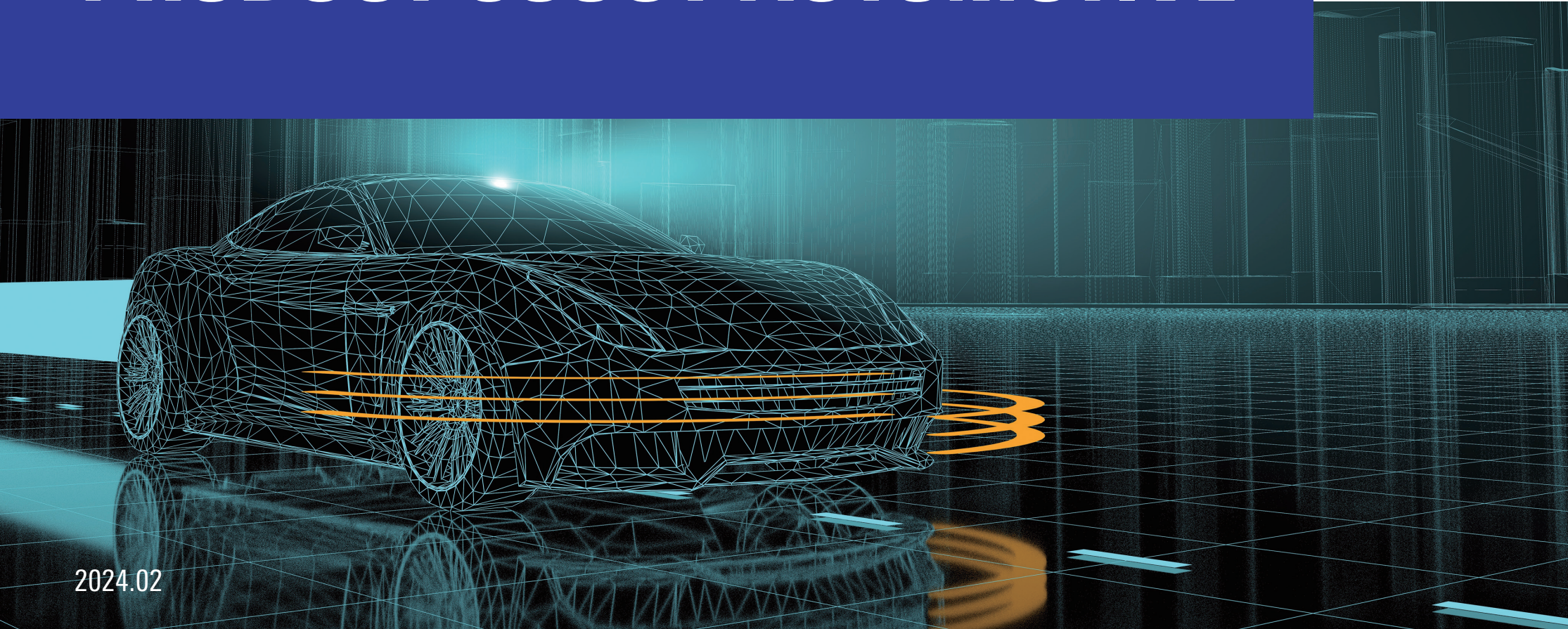


# PRODUCT SCOUT AUTOMOTIVE







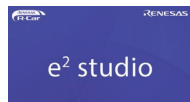


TOOLS

SOFTWARE TOOLS

R-Car e<sup>2</sup> Studio

- e<sup>2</sup> 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](http://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](http://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)

3<sup>RD</sup> 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](http://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](http://www.lauterbach.com)



STARTER KITS

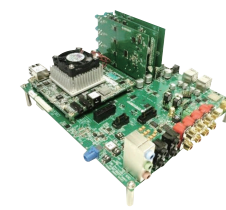
R-Car Starter Kit Premier (R-Car H3e-2G)

- 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, I<sup>2</sup>C,
  - » 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, I<sup>2</sup>C
  - » 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

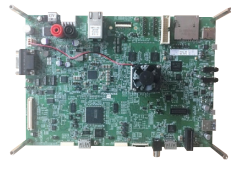
- Simplifies the process of establishing open-source automotive Linux environments.
- The R-Car starter kits are designed to simplify the task of setting up automotive Linux environments for engineers who are new to the development of automotive software, and are competitively priced so that each developer 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

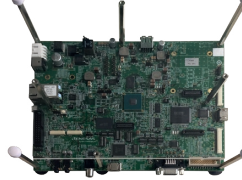
R-Car E3 Development Board "EBISU"

- 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



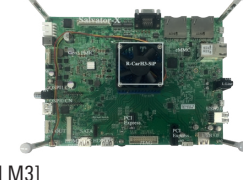
R-Car D3 Development Board "DRAAK"

- 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



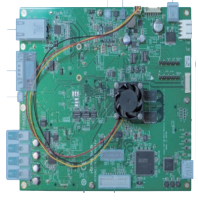
R-Car H3/M3/M3N Development Board "SALVATOR-XS"

- 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)



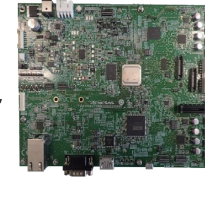
R-Car V3M Development Board "EAGLE"

- 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



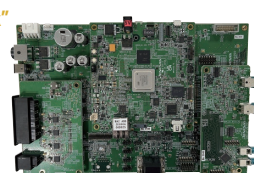
R-Car S4 Reference Board "Spider"

- 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

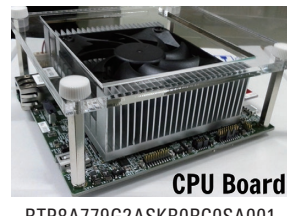


New all in one board:



RTP8A779G0ASKB0F10SA100

CPU board:

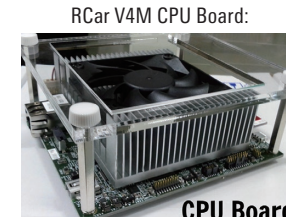
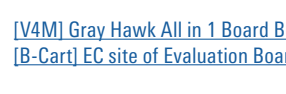


RTP8A779G2ASKB0RC0SA001

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



RTP8A779H0ASKB0RC0SA001

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



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