RENESAS R-CAR V3H

Best-in-Class ASIL B/C System-on-Chip, 7.2 TOPS for Intelligent Camera Applications

R-Car V3H Delivers Best-in-Class TOPS/Watt for Cutting-Edge Computer Vision, Supports the latest NCAP 2020 requirements, including Driver Monitoring Systems and provide a migration path toward NCAP 2025. Building on the state-of-the-art recognition technology introduced with the R-Car V3H in February 2018, which includes integrated IP for convolutional neural networks (CNN), the updated R-Car V3H delivers 4 times the performance for CNN processing compared to the earlier version and is achieving up to overall 7.2 TOPS processing including all Computer Visions IPs – while maintaining low power consumption levels.

Target Applications
- Front Stereo Smart Camera for NCAP
- Surround View with 3D visualization
- Driver and Occupant Monitoring System
- Lidar System
- Intelligent Survey Camera
- Robotics
- Industrial Applications

Key Features
- 4 Arm® Cortex®-A53 : 9.2 kDMIPS
- Dual Cortex-R7 LockStep cores to run AUTOSAR : 2kDMIPS
- Overall Tops performance : 7,2 TOP :
  - CNN IP
  - Multi-Threading Computer Vision Engine
  - HW Accelerator: optical flow, object detection, ...
- Integrated ISP with up to 8 Mpixel sensors, RGB-IR support
- Automotive Interface; Ethernet AVB, CAN FD and FlexRay
- ASIL D deel. process for systematic capability for the full SOC
- Supporting metric targets for ASIL B (sensor layer, application processors) and ASIL C (realtime Domain) safety goals

Block Diagram

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Benefits

- R-Car V3H is tailored for the Intelligent Camera System use case, balancing Innovation and automotive constraint.
- Overall performance of 7.2 TOPS, capable of handling any state-of-the-art neural networks.
- Integrated ISP supporting majors Sensor Vendors ICs drastically reduce system BOM. 8 Mpixel Sensor enable V3H to be use for Level 3 while support of the latest RGB-IR standard make V3H ideal for Driver Monitoring system.
- ASIL certified SOC reduce SW development effort and remove the need additional redundant SOC.
- Real time ASIL C CPU core avoiding the need of external MCU to handle Realtime task and Autosar.
- Integrated development environment enables fast time-to-market for computer vision & deep learning-based solutions.
- Renesas Provide PMIC specially developed for R-Car V3H allowing optimized power management in ASIL environment.
- Wide Partners Ecosystem, providing HW tools, Perception System for Camera, Lidar and Sensor Fusion with Radar.

Condor Development board

- NOR flash memory
- LPDDR4-SRAM for DSBC4
- DMI output connector for LVDS
- Camera input connectors
- eMMC memory for MMC
- PCIe x 4 connectors (2 lanes) for PCIe
- Ethernet n CAN, FlexRay
- Power supply : 12.0-V DC input

Packages include
- Evaluation Board
- Power Supply
- CD with User’s Manual

Software
- Linux BSP (Linux.Org)
- Boot SW

V3H Starter Kit

- 2 GBytes DDR3L-1600
- 64 Mbytes Hyper Flash & 64 Mbytes QSPI Flash
- 16 GBytes eMMC
- HDMI, RGB, LVDS, MipiCSI2, EthernetAVB, CAN
- JTAG, Debug Interface
- On board Connector with SOC signals

Packages include
- Starter Kit
- Power Supply
- USB & HDMI Cable

Software
- Linux BSP (Linux.Org)
- Configuration tools
- Mimi Monitor

SW Development Environment

Renesas company wide IDE initiative with ADAS specific Plug-ins

Edit, build, debug and profile R-Car applications on target and on simulator

Seamless debug of ARM and hardware accelerator cores

Profiler integration taking advantage of build-in Trace

HW Ordering Reference

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<th>Renesas Board</th>
<th>Product Name</th>
<th>Reference</th>
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