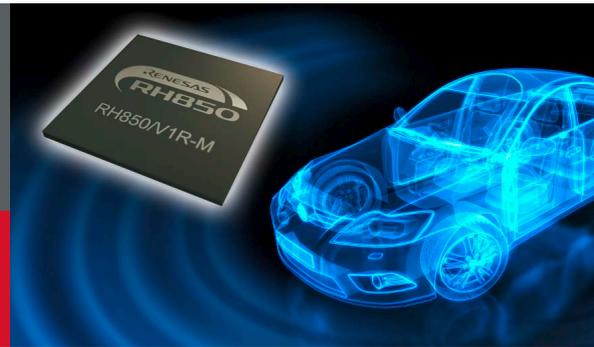


High-Performance Recording of Raw Radar Data and Algorithm Data With the Renesas RH850/V1R

Case Study Renesas



The Partner

Renesas, a world-leading supplier of MCUs and SOCs for automotive applications, offers the Renesas autonomy™ platform, a comprehensive range of solutions for ADAS and automated driving. The RH850/V1R series, which is part of Renesas autonomy™, provides high computing power and a freely programmable DSP for better object resolution and movement detection.

The Challenge

Synchronous recording of raw radar data, internal controller signals and bus messages

To develop radar solutions, it is necessary to capture two different types of data from the radar sensors: raw radar data and algorithmic data such as detected object lists and the results of FFT computations that are available in the form of XCP data. In such scenarios, up to 100 MB/s of raw radar data and up to 50 MB/s XCP data may be received simultaneously. This data has to be recorded synchronously with other information, such as bus data. The processor must not be permitted to stop working while the measurement data is being transmitted as this would result in the loss of radar data.

The Solution

Compact, high-performance measurement and calibration system with data trace measurement interface

Physical access to the radar and XCP data is achieved using the VX1000 family of products. The plug-on device (POD) is connected directly to the RH850/V1R microcontroller over two 3.125 Gb/s Aurora interfaces. The POD transmits the data to the VX1135 Base Module at 5 Gb/s over the Vector High Speed Serial Link (HSSL2). The Base Module then routes on the raw and XCP data to CANape over two Gigabit Ethernet connections. A special measurement method prevents simultaneous incoming radar and XCP data from overloading the Aurora interface and consequently causing a loss of data. Any CAN/CAN-FD connections that are present can be connected directly to the VX1135. The data is again routed to CANape over the Ethernet interfaces. The Distributed High Performance Recorder (DHPR) concept in CANape makes it possible to

connect a sensor to an individual recorder that can be adapted for use with the raw data protocols of the various sensor manufacturers quickly and easily. The recorders make optimum use of the PC resources and can also be used by multiple PCs in distributed environments. In this architecture, CANape is responsible for time synchronization as well as for start, stop and trigger operations. Approximately 1 GB/s of measurement data can be written per PC depending on the hard drive configuration.

The Advantages

An end-to-end solution, perfectly tailored to the RH850/V1R microcontroller

- > Universal measurement solution for different sensor manufacturers
- > Complete plug-and-play system, installed and tested
- > A single POD captures both raw radar data and XCP data; this minimizes space requirements for the radar sensor and reduces the cost of integration
- > Fully scalable in terms of the number of sensors
- > Exact synchronization of all measurement data from radar and video sensors, ECUs, bus systems, analog measurements, etc. in CANape

