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High-Performance Recording of Raw Radar Data and Algorithm Data With the Scalable AURIX™ Radar Microcontroller Family

Case Study Infineon

The Partner

Infineon Technologies AG is a world leader in semiconductor solutions that make life easier, safer and greener. With sales of more than 20 million radar chips, it is the global leader in the fast-growing market for driver assistance systems.

The Challenge

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

The precision-made 77-GHz chips from Infineon are highly scalable for short- and long-range applications. They are used in radar-based driver assistance systems like adaptive cruise control and collision warning. Objects can be detected at distances of up to 250 m.

To develop radar solutions, it is necessary to acquire 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 of XCP data may be received simultaneously. These data have to be recorded synchronously with other information, for example bus data.

The Solution

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

Physical access to the data is achieved using VX1000 measurement and calibration hardware. The plug-on device (POD) is connected directly to the AURIX radar microcontroller via the Aurora interface and 4 LVDS lanes. The POD transmits the data to the VX1135 base module at up to 5 Gbit/s over the Vector High Speed Serial Link (HSSL2). The base module then routes on the raw and XCP data to the CANape MCD tool over 2 Gbit Ethernet connections. 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 Infineon AURIX 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