Standard issue

Two prevailing data standards for processing automotive raw data are currently competing for pole position in the race to develop AVs

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Above: Measurement data converter from b-plus

Left: Bernd Eggl, head of product strategy, b-plus

During test drives, terabytes of data are collected in a matter of minutes to validate automated driving and driver assistance systems. The high-resolution sensors on the test vehicle provide raw data that the systems use to form an accurate picture of the vehicle's environment. State-of-the-art imagers installed in cameras in the ADAS/AD area deliver up to 8MP at 40fps, which corresponds to approximately 450MB/s of raw data.

Standardized vehicle bus systems such as CAN, FlexRay and automotive Ethernet cannot fully map the data transmission requirements for future-oriented ADAS/AD systems. Proprietary transmission solutions based on GMSL or FPD-Link have established themselves, but pose completely different challenges for the development or component purchasing of ADAS/AD systems.

Two standards are emerging in this area: the Automotive SerDes Alliance's ASA Motion Link and the MIPI Alliance's MIPI A-PHY. Both organizations are working toward a standard that covers current and future requirements.

Complex requirements

In ADAS/AD E/E vehicle architectures, raw data processing is increasingly performed on centralized platforms. Transmission paths from the sensor to the high-performance computers must meet automotive requirements, including increased EMC immunity to interference, long service life, low costs per receive and transmit node, or simple cable routing.

System requirements such as low latencies, secure transmission and very high but asymmetric bandwidth provision must be taken into account.

Different speed classes in transmission are necessary to cover a wide performance range of sensors in a cost-optimized way.

Another crucial aspect is basic network functions. Simple data filtering and forwarding at the PHY level should be possible to forward image data from one camera to two independent systems. This also eases the measurement systems integration, used in the early stages for raw data acquisition in test carriers.

Which will win the race?

One important factor for the success of a standard is for it to appeal to as many stakeholders as possible. MIPI has achieved an important milestone here by adapting the A-PHY Interface (A-PHY) Version 1.0 specification as an IEEE standard. It is absolutely essential to reach a critical mass of actual users on all levels, from chip and ECU manufacturers through to vehicle producers. Fast availability of the standard implementations in SoCs, sensor ICs such as imagers, and even as pure SerDes chipsets can be a decisive boost in the race for pole position. The race remains exciting.

With an extensive product portfolio covering ADAS/AD measurement data acquisition and verification, b-plus's range of interface solutions for high-bandwidth sensors are essential and are one of the company's areas of expertise. These solutions support various technologies including MIPI A-PHY or ASA Motion Link using a flexible modular product concept based on FPGA technology.

Products such as MDILink or b-HiL are therefore already equipped for new implementations, in addition to well-known standards such as GMSL or FPD-Link. The bus systems and corresponding sensors can be easily accessed via 10GbE. Raw sensor data can then be easily recorded using systems such as BRICK2 or DATALynx ATX4, then processed via algorithms.

It is no longer expedient to capture all measurement data. What is required for today and tomorrow is only the data that is relevant for the subsequent process. The 'Smart Recording' concept favored by b-plus uses AI technology to ensure that only relevant data is recorded in the test carrier or vehicle. This relieves the subsequent data handling in the verification and validation of ADAS/AD systems, or in the data-driven development process of AI-supported system functions. ❮