Shorter development times with more efficient tests

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How latest generation measurement technology helps the automotive industry to gain market presence faster with new models.

Rapidly reacting to new market requirements with new, but mature models: That is currently the key to success, not only in the automotive industry. To play in the top league of global competition with the rapidly changing outline conditions and markets, you need to stay at the cutting edge with your developments. Just a few years ago, large off-road SUVs were in demand, now the market demands efficient climate protection in its vehicles - and what about tomorrow?

The development of new vehicles has to be fast enough today to meet rapidly changing requirements and, at the same time, the increasing demands regarding vehicle quality. To master this balancing act, the entire development process must be monitored on the test bench. This also applies to the test cycles during development, which must continue to deliver accurate results under ever-decreasing implementation times.

Modern measurement technology helps to meet the growing requirements in inspections and tests, and is even capable of significantly accelerating the entire test process - by up to factor of 20 in some cases. The measuring amplifier system QuantumX from HBM has specifically been developed specially for more efficiency during tests and inspections. The path to success: QuantumX enables division of time and organization during the preparation and implementation of tests.

Measurement therefore becomes simpler and more effective in future: The preparation time for measurements can be reduced by a factor of 20 with this principle and the automatic settings also increases trust in the accuracy of the total measurement chain.

QuantumX uses the Advanced Plug & Measure technology (APM). This technology combines the automatic transducer recognition via TEDS, the electronic data sheet in the transducer, with the advantages of a modern, universal data acquisition system. Together with APM, this results in a measurement system that ensures significant acceleration of tests and inspections.

TEDS as "one wire", "zero wire" and "no wire"

Connect the transducer - and measure! This principle is possible with TEDS, the electronic data sheet in the transducer. Every transducer equipped with TEDS can automatically transfer its main characteristics to the data acquisition system - and can therefore be used immediately without any manual setup.

TEDS is based on the international standard IEEE 1451.4 This standard guarantees that the transducers and data acquisition

systems from different manufacturers can exchange information with one another. Each TEDS has a globally unique identification number. It is therefore possible to trace which measurements have been carried out with which transducers. The calibration validity can also be verified automatically with the stored date of the last calibration. HBM offers patented "zero wire" TEDS, which - as an alternative to normal "one wire" solutions - do not require an additional wire in the cable.

In the past, the use of TEDS in the automotive industry, for example in engine test benches, was to some extent pushing against the limits. The use of TEDS memory chips was often problematic because of the thermocouples or pressure hoses in use here.

In order to utilize the advantages of direct connection, HBM upgraded the patented zero wire technology to cover this application area - and has now completely left out the cable: No wire any more!

This was made possible by the use of RFID (Radio Frequency Identification) modules, which enable wireless TEDS connection.
With RFID, mechanical and electrical contact with the amplifier is no longer required – contents can be read out without contact ("no wire").

The second APM component: Intelligent and universal amplifiers

The advantages of TEDS - automatic, error-free and rapid connection of transducers - are obvious. But TEDS can only fully exploit its potential when the corresponding measurement system optimally supports automatic transducer identification.

The future in test benches belongs to the all-rounders of the measurement systems. The QuantumX basic module MX840 is a real multi-talent in this respect: MX840 can acquire the data from a different type of transducer on each input channel - and over 2,000 parameters can be set.

These settings do not, however, have to be implemented manually, instead they are automatically carried out by QuantumX. TEDS again plays a key role here: QuantumX independently recognizes a newly connected transducer with TEDS and sets itself automatically. With just a few seconds, QuantumX signals the software that it is ready for measurement.

In this way, APM makes settings safer, excludes humans as a source of error and increases trust in the measurement results. The comprehensive information stored in the TEDS supplements the knowledge of the user regarding the transducer technology used; QuantumX automatically converts it into its own settings.

This means measurement engineers can concentrate fully on the measurement and evaluation of the measurement results themselves. The application options of the complete system are therefore greatly increased: One module covers measurement tasks with numerous temperature measurements as well as the acquisition of electric signals. This leads to higher investment security.

New processes for efficient measurements

TEDS plus intelligent universal measurement systems: Advanced Plug & Measure (APM) not only significantly speeds up test bench applications but it also separates the test-preparation and implementation procedures:

- The allocation of measuring points to the hardware channels is recognized by the PC software. For example, transducers can be pre-installed in an engine test bench.
- The measuring point designations and transducer description are stored in the TEDS.
- In the test cell itself, the transducer cable can then be inserted in any sequence into any input channel. Thanks to APM, the universal input amplifier automatically adapts and the complete measuring point-hardware channel allocation is reported to the system.

This process can also be implemented by personnel untrained in measurement technology in approx. 20 minutes.

QuantumX from HBM is the ideal measurement system for the global market with ever shorter development and test cycles. QuantumX - with APM - provides the technology to significantly accelerate test setup and implementation. Its performance substantially increases the customer’s capacity to obtain precise results quickly and accomplish new developments more rapidly.