Motion simulation and test

One-axis motion simulators have been outdated with the advent of multi-axis sensors packaged in one chip, which call for two- and three-axis inertial guidance test systems

With offices in Bubikon, Switzerland, and in Pittsburgh, Pennsylvania, USA, Acutronic Group has been providing innovative motion simulation and test solutions for decades. Its products consist of hardware-in-the-loop (HIL) systems that provide *in situ* testing of components and devices (guidance, navigation and control boxes, dynamic stability control modules, etc), as well as rate table systems that enable calibration and verification of components with inertial sensors.

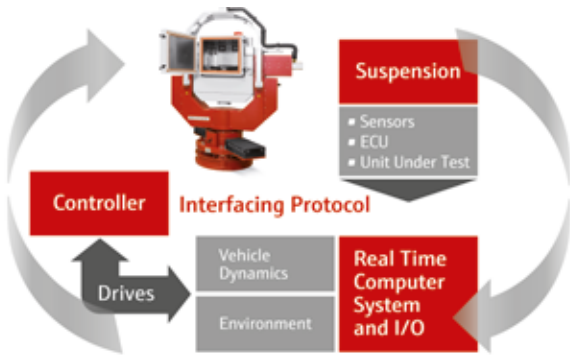
Acutronic systems have become standard equipment for a variety of applications in the automotive industry. Today its systems are used to test airbag, DSC, rollover detection and other modules containing inertial sensors.

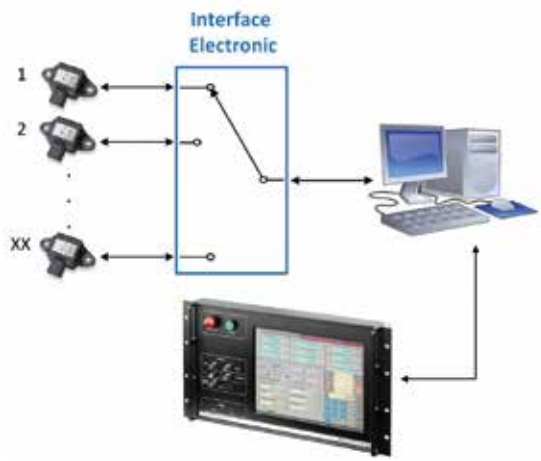
Acutronic believes in a three-prong strategy to best serve the needs of the automotive industry. At the most basic level, the company provides one- and two-axis test systems (rate tables) that supply high-precision motion input for devices under test (DUT). Users can interface with the system's closed-loop controller in order to produce a motion profile, as shown in the image above.

At the same time, data acquisition modules record feedback from the DUT. Subsequently, the DUT response is compared to an anticipated response based on the motion profile, and calibration or verification analysis is conducted in real time. Single- or dual-axis rate tables are used to reorient the DUT in the x, y and z directions.

As a second option, Acutronic offers an array of automatic test equipment (ATE) solutions for automotive component and module testing. In addition to providing a motion test system, a fully integrated solution consists of mechanical and electrical interfaces to the DUT, data acquisition hardware and a software suite responsible for controlling test profiles and analyzing resultant test data. Once deployed, the system's inherent throughput reduces per-unit test cost and yields near-real-time results. Depending on the DUT's physical dimensions and test profile, hundreds of thousands of DUTs may be tested on an Acutronic system per annum.

Thirdly, Acutronic provides HIL systems in order to test discrete sensors, safety, and control modules or entire vehicles. The systems use physical motion to expose devices to representations of real-world driving conditions. The HIL control system communicates in real time with available sensor suites and safety systems and compares initiated actions to those expected for particular driving conditions. A simulation system like this provides a unique and safe environment where multiple systems can be tested at the same time, evaluating each subsystem's performance as well as the entire ecosystem. The HIL system is suitable to test both manned and autonomous applications. It provides a platform to improve performance prior to or in conjunction with road tests, often resulting in significant cost and time savings. Emulating V2V interactions might be one such example.





TOP: The basic components of a HIL system

ABOVE: Acutronic's motion control technology features a modular architecture, which makes it more adaptable to applications and facilitates obsolescence handling

Acutronic's state-of-the-art solution portfolio provides three approaches to improve product performance and reduce time-to-market for components and systems. Solutions can be customized for the needs, for sensor suppliers, Tier 1 suppliers and vehicle makers, including developers of autonomous driving systems. ❮

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