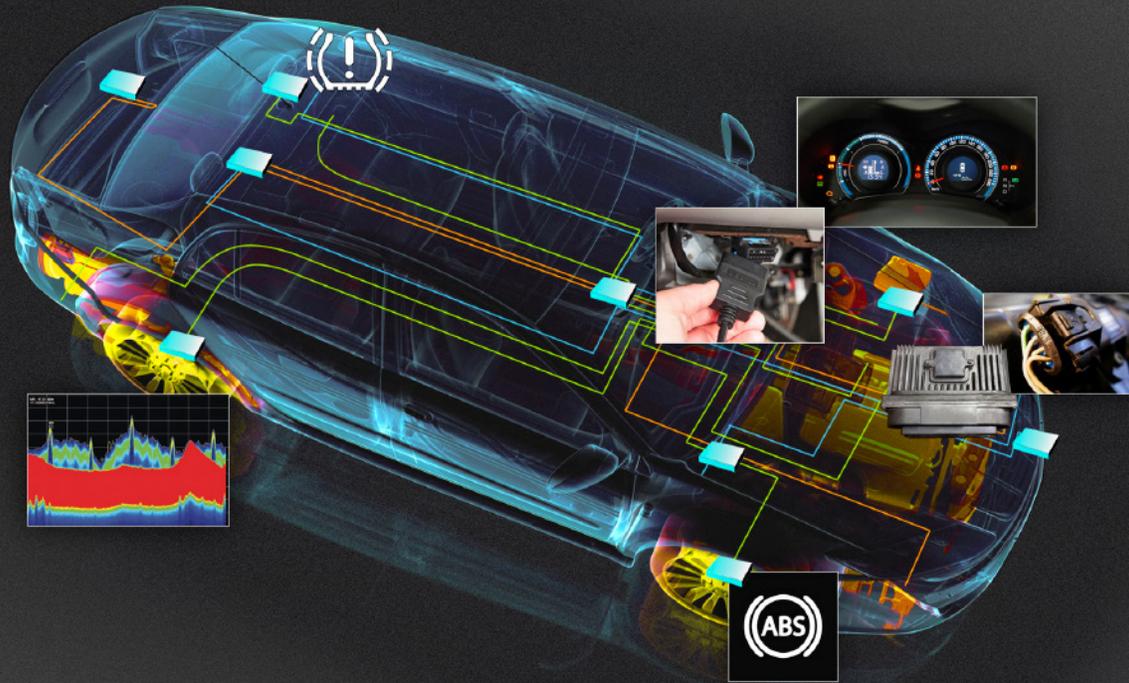


# Test Methods for Automobile Communication and Control Systems



## Learn How to Resolve a Test and Measurement Challenge That's Driving You — Download our Applications Kit

[www.keithley.com/automotive/control](http://www.keithley.com/automotive/control)

The tremendous increase of electronic functions and controls and the need to communicate vital information throughout the vehicle have increased the complexity of today's vehicle designs and the test processes needed to debug and verify these designs. **Download our applications kit and learn more about:**

### ■ Sensor Development and Characterization

- R&D and production testing of sensors
- Testing MEMS accelerometers used in cruise control and stability control systems

### ■ Testing Engine Control Units (ECUs)

- Simulating sensor signals

### ■ Testing Cables, Connectors, and Insulators

- Continuity testing
- Insulation resistance testing

### ■ Testing Buses Used to Communicate between ECUs, Sensors, and Actuators

- Functional testing of ECU output signals
- Tracing data flow through the automotive network
- CAN, LIN, MOST, FlexRay
- Protocol analysis

### ■ Electro-Magnetic Interface (EMI) and Electro-Magnetic Compatibility (EMC) Testing

- Diagnostics and debugging
- Pre-compliance and compliance testing of ECU modules

## DC and AC Communications and Control Testing Solutions for Today's Automobiles



### Parametric Test Systems

Testing MEMS Accelerometers

- Low-level sourcing and measurement minimizes heat generation during MEMS testing
- Precise high-speed measurements with automated probe stations

### Source Measure Unit (SMU) Instruments and DC Power Supplies

Electrical Characterization of Sensors

- SourceMeter® SMU instruments provide a fully-integrated, four-quadrant, all-in-one solution for current/voltage testing of sensors
- Power supplies create a series of voltage steps to simulate battery voltage output responses to varying engine loads



### Signal Generators

Sensor Signal Simulation

- Creates a virtually unlimited number of any type of signal – analog or digital, ideal or distorted, standard or custom



### Digital Multimeter Switch/Data Logger Systems

Multipoint Testing of Automotive Components and Systems

- Production/functional testing of signals from multiple sensors
- Continuity and low resistance testing of cable harnesses and connectors
- Temperature testing and monitoring for air conditioning and heating elements and ECUs



### Mixed Signal Oscilloscopes and Probes

Engine Control Unit and Communication Link Testing

- Test and analysis for automotive communication protocols – CAN, LIN, FlexRay, Most, and others
- Analyze nanosecond transient noise spikes in ECUs for engine control



### Real Time Spectrum Analyzers and Mixed Domain Oscilloscopes

EMI and EMC Testing

- Capture transient signals as narrow as 3.7µs with real time spectrum analyzers
- Correlates time-domain events with spectral emissions for efficient troubleshooting with mixed domain oscilloscopes



Visit [www.keithley.com/automotive](http://www.keithley.com/automotive) to learn more.

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