

Basic Automotive Test Products

CATALOG



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Introduction

The automotive industry has introduced technologies to improve safety, performance, and the overall driving experience. Many of these transformations have centered on advances in electronics and sensors to create a vehicle that can think for itself. Complex solutions around the connected car, electric vehicles, and autonomous driving have increased testing requirements to ensure a vehicle meets all design specifications. However, not all testing requires complex solutions to ensure the car's safety, performance, and driving experience is amazing for drivers, passengers, and the environment.

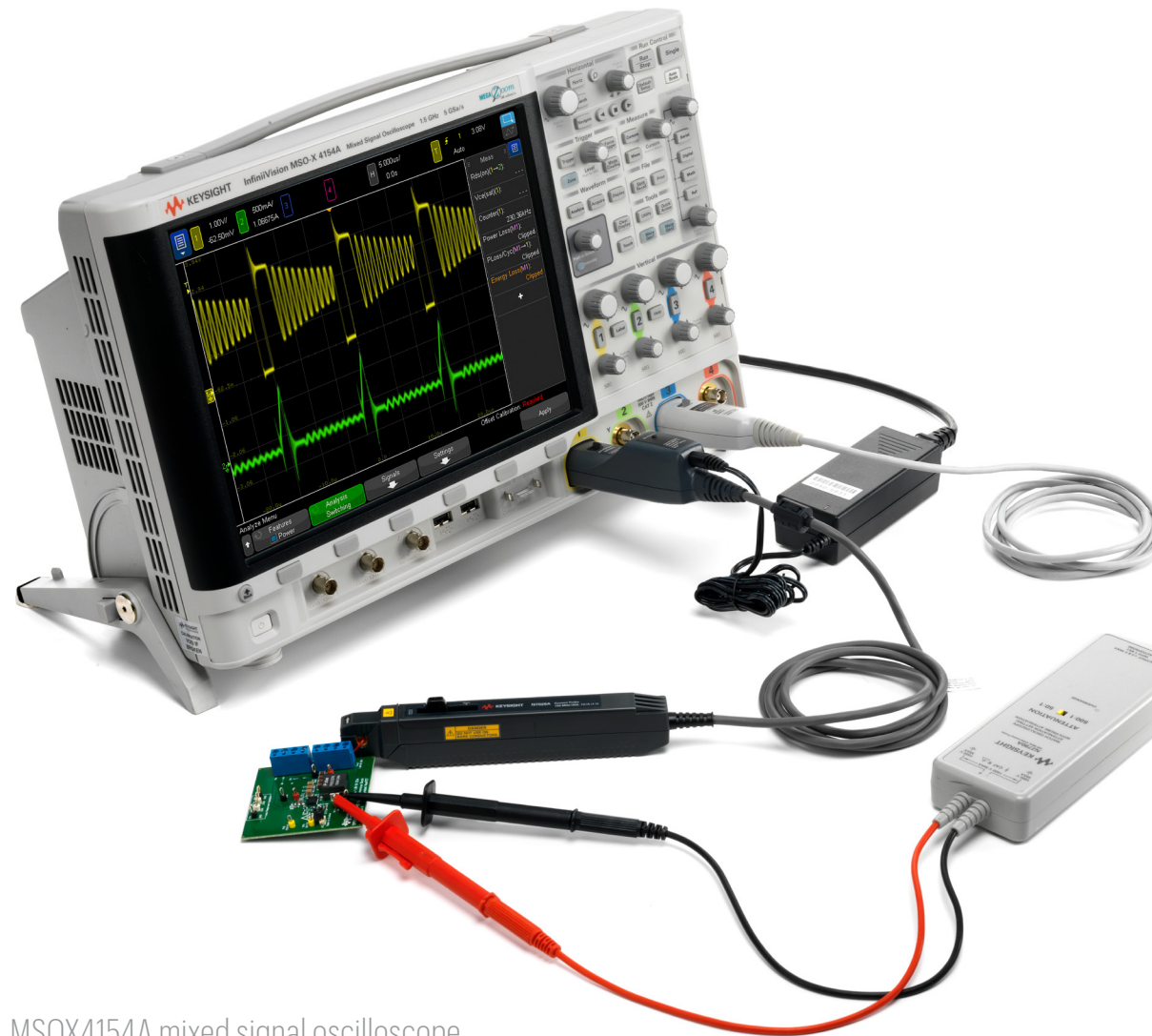
Welcome to the world of basic test tools for the automotive industry from Keysight Technologies. This catalog summarizes our most effective and affordable tools to meet many of the testing requirements for today's advanced vehicles. These test solutions are available from Keysight and our authorized distributors.



Increasing Speed, Safety, and Reliability of In-Vehicle Communications Networks

Modern vehicles contain hundreds of electronic modules and sensors communicating over a variety of serial buses with electronic control units (ECUs). Advanced technologies, such as collision avoidance and autonomous driving, require increasingly faster transmission rates that must be error-free across these automotive buses. Oscilloscopes are the most common tool used to test and debug automotive electronic signals. However, not all oscilloscopes are equal.

Keysight offers a variety of frequency ranges (50 MHz–110 GHz) and formats (bench, USB, modular, handheld, probes, and accessories) to meet all your scope testing needs. Keysight's InfiniiVision 3000T, 4000, and 6000 X-Series and Infiniium S-Series oscilloscopes offer automotive software bundles for serial trigger and decode of most automotive serial buses (for example, CAN, CAN-FD, LIN, FlexRay, SENT, PSI5, NRZ, CXPI, and automotive Ethernet).



MSOX4154A mixed signal oscilloscope
N7026A high sensitivity clamp-on current probe
N2790A high voltage differential probe

Increasing Speed, Safety, and Reliability of In-Vehicle Communications Networks

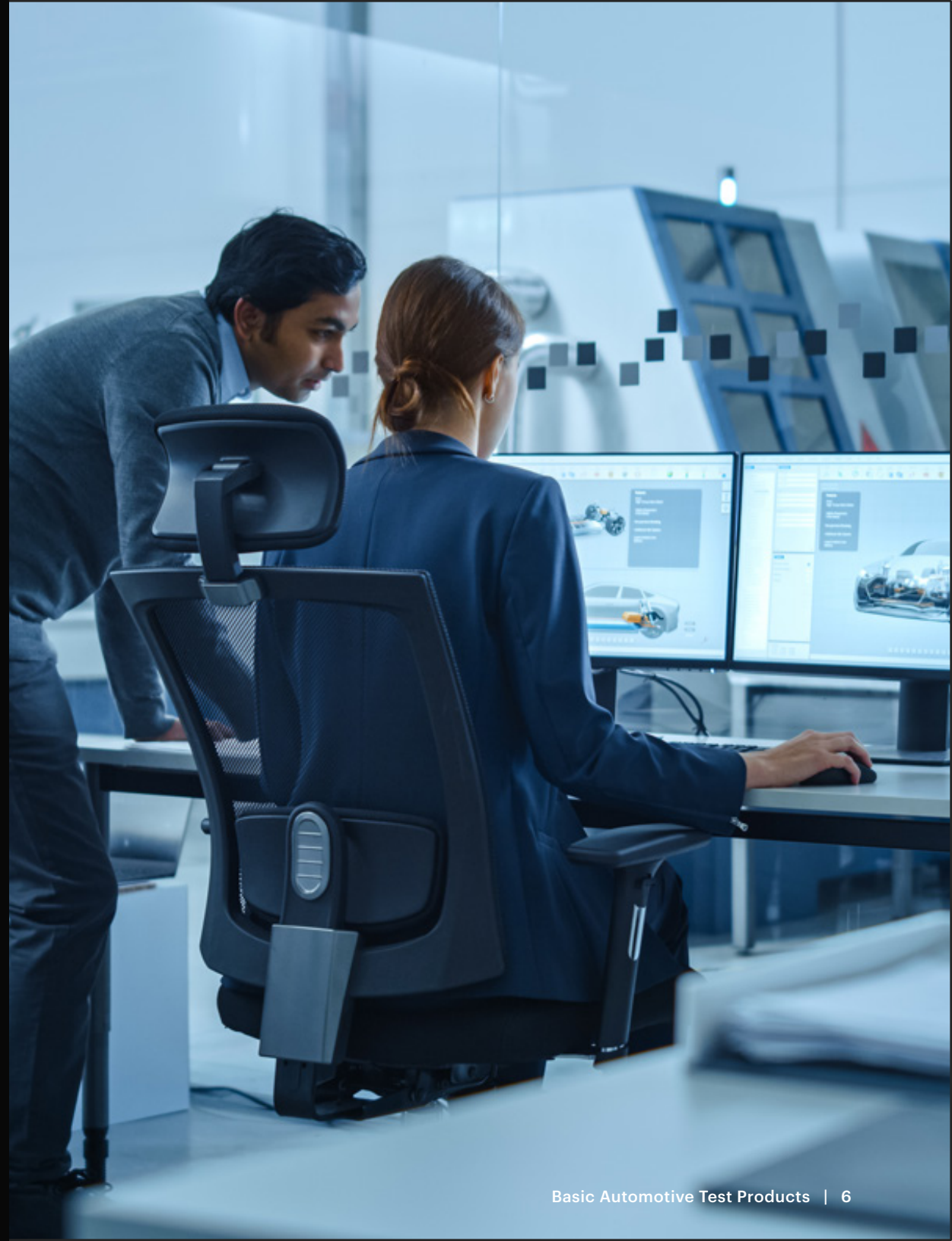
The 3000T and 4000 X-Series oscilloscopes deliver refresh rates of 1 million waveforms per second, capturing infrequent glitches and errors that can be safety-critical. The S-Series scopes provide a fast, easy way to verify and debug today's demanding automotive Ethernet transceiver test requirements.

| Product | Bandwidth | Channels | Memory depth (max) | Sample rate (max) | Update rate | |
|---|-----------------|----------|--------------------|-------------------|----------------------|----------------------------------|
| InfiniiVision 3000T X-Series | 100 MHz–1 GHz | 4 + 16 | 4 Mpts | 5 GSa/sec | 1,000,000 wfms/sec | Get a Quote > |
| InfiniiVision 4000 X-Series | 200 MHz–1.5 GHz | 4 + 16 | 4 Mpts | 5 GSa/sec | 1,000,000 wfms/sec | Get a Quote > |
| InfiniiVision 6000 X-Series | 1 GHz–6 GHz | 4 + 16 | 4 Mpts | 20 GSa/sec | 450,000 wfms/ sec | Get a Quote > |
| Infiniium S-Series | 500 MHz–8 GHz | 4 + 16 | 400 Mpts | 20 GSa/sec | 1,000 wfms/sec | Get a Quote > |

Data Acquisition for Accurate Automotive System Analysis

Need data? Keysight has **delivered data acquisition (DAQ)** and switching solutions for more than 25 years. DAQ solutions include voltage, current, power, temperature, strain, vibration and acoustic measurement, environmental testing, durability, engine monitoring, battery testing, and signal routing applications.

Keysight's DAQ970A data acquisition system offers a three-slot mainframe with nine switch-and-control plug-in modules. It comes with a built-in 6½-digit (22-bit) digital multimeter (DMM). The Keysight 34980A multifunction switch / measure unit is a one-box test solution. It offers fast switching speeds and high channel counts for medium to high-density switch / measure applications in design verification, automated test, and data acquisition.



Data Acquisition for Accurate Automotive System Analysis

| Product | Mainframe slots | Plug-in modules | Scan rate | Scanning memory | |
|--|-----------------|-----------------|--------------|-----------------|----------------------------------|
| DAQ970A data acquisition system | 3 | 9 | 450 ch/sec | 5 GSa/sec | Get a Quote > |
| 34980A multifunction switch / measure mainframe and modules | 8 | 21 | 1,000 ch/sec | 500,000 pts | Get a Quote > |



DAQ970A - data acquisition system

Taming the Hostile RF World of Today's Vehicles

Modern automobile manufacturers produce increasingly intelligent and connected cars with sophisticated navigation, safety, and infotainment features that operate across a broad frequency spectrum. Further complicating matters, the vehicle's surroundings are often unpredictable, making it difficult to accurately characterize radio frequency (RF) and microwave system performance.

Keysight's family of **FieldFox handheld microwave analyzers** streamlines automotive RF and radar verification tests to meet the requirements of emerging technologies. The portable, lightweight units provide easy-to-use, one-button integrated measurements that verify critical cable and vehicle antenna RF subsystems. Failure to properly measure these subsystems can result in signal loss, radar detection failure, or cross talk in control lines. FieldFox is also the ideal tool for troubleshooting electromagnetic interference, which requires wideband spectrum scanning, focused narrowband, and real-time signal analysis. With the new N9918B FieldFox analyzer, you can easily capture and demodulate intermittent beam-sweeping technologies used in 5G and radar systems.



Taming the Hostile RF World of Today's Vehicles

| Product | Frequency (max) | Instrument type | |
|-------------------------------------|-----------------|--|----------------------------------|
| FieldFox RF and microwave analyzers | 4–50 GHz | Cable and antenna analyzer / spectrum analyzer / vector network analyzer | Get a Quote > |



FieldFox RF and microwave analyzers

Managing Power in a Harsh Automotive Electrical Environment

Automotive power systems operate in extreme electrical environments. High-current motors, solenoids, and other components cause power system voltage transients and dropouts. The mission-critical nature of automotive electronics makes thorough testing of ECUs a must.



Managing Power in a Harsh Automotive Electrical Environment

Keysight's family of **DC power supplies** provides the optimal choice of voltage, current, capability, and precision to test your ECU. For a fully integrated approach, the award-winning **DC power analyzer** solution accommodates DC power and electronic load modules in a single instrument. Keysight's automated test equipment system power supplies have changed the way engineers prove their designs, understand issues, and ensure product quality. Power supplies and analyzers are useful tools for automotive engineers designing and testing key fobs, tire pressure monitors, battery power monitors, and other Bluetooth® accessories. Power supplies are critical to accurately test all your automotive electronic devices.

| Product | Number of outputs | Mainframe slots | Plug-in modules | Total power | |
|---|-------------------|-----------------|-----------------|---------------|----------------------------------|
| Bench power supplies | 1-3 | - | - | 30-400 W | Get a Quote > |
| DC power analyzer | 4 | 4 | > 30 | 600 W | Get a Quote > |
| N6700 Series modular power supplies | 1-4 | 4 | > 30 | 400-1,200 W | Get a Quote > |
| N7900 Series advanced power supplies | 1 | - | - | 1,000-2,000 W | Get a Quote > |

EMI Pre-Compliance Testing for Automotive Designs

Avoid costly delays resulting from failed compliance testing with Keysight's electromagnetic interference (EMI) measurement application. Running on Keysight's CXA signal analyzer, the application allows you to perform pre-compliance measurements and diagnostic evaluation of your automotive electronic designs. Combined with Keysight's CXG signal generator and PathWave measurement application, these solutions give you the tools you need to ensure your automotive electronics are safe from EMI failure.



EMI Pre-Compliance Testin for Automotive Designs

| Product | Frequency range | |
|---------------------------------------|--------------------|----------------------------------|
| N9000B CXA signal analyzer | 9 kHz–26.5 GHz | Get a Quote > |
| N5166B CXG RF vector signal generator | 9 kHz–3/6 GHz | Get a Quote > |
| PathWave EMI measurement application | Multi-test capable | Get a Quote > |

N9000B CXA



Handheld Instruments for Accurate Portable Automotive Testing

Keysight's family of handheld and portable test tools is constantly growing. Our handheld DMMs, capacitance and LCR meters, clamp meters, insulation resistance testers, and oscilloscopes are rugged. They are built to address the test capabilities you need to complete your automotive testing. Use Keysight's thermal imagers to test automotive electronics, exhaust systems, heating and cooling, and brake temperatures. Keysight's handheld test instruments give you the power and accuracy you need to test on the bench or in the field.



TrueIR thermal imager

Handheld Instruments for Accurate Portable Automotive Testing

| Product | Number of models | Key specs | |
|------------------------|------------------|------------------------------|----------------------------------|
| Handheld DMMs | 7 | 4 and 4½ digits | Get a Quote > |
| Handheld oscilloscopes | 2 | 100–200 MHz | Get a Quote > |
| TrueIR thermal imagers | 3 | -20 deg–350 / 650 / 1,200 °C | Get a Quote > |



General Bench Test and Accessories

General test instruments for the bench are a staple in any electronics test lab, especially in the automotive industry, where testing plays a critical role in ensuring design performance and reliability. Automotive engineers must test and evaluate prototype designs fast to meet all performance specifications and maintain time-to-market schedules. Keysight has long been known for providing test instruments and accessories — including **basic oscilloscopes** and **probes**, **DMMs**, **power meters** and **sensors**, **waveform and function generators**, and **source measure units (SMU)** — to engineers around the globe.



General Bench Test and Accessories

| Product | Formats | Key specs | |
|---|-----------------|---|----------------------------------|
| Truevolt DMMs | 100 MHz–1 GHz | 6½ and 7½ digits 300–50,000 readings/sec | Get a Quote > |
| Power meters and sensors | 200 MHz–1.5 GHz | 51 product offerings | Get a Quote > |
| Trueform waveform and function generators | 1 GHz–6 GHz | 120 MHz 1 GSa/sec | Get a Quote > |
| SMU | 500 MHz–2.5 GHz | 1 and 2 channels | Get a Quote > |
| Streamline Series USB products | 500 MHz–8 GHz | 4.5–53 GHz / 200 MHz–1 GHz / 1 GHz I/Q bandwidth | Get a Quote > |

Truevolt DMMs



Test Automation with PathWave BenchVue Software

PathWave BenchVue software allows you to easily configure and control a wide range of test instruments on your bench. Control, automate, and simplify your test setup and reporting with minimal instrument knowledge and no coding required. With PathWave BenchVue, you can control multiple instruments, access integrated applications, automate test sequencing, and visualize, analyze, and export data to obtain useful information.

PathWave BenchVue offers free basic platforms and applications to get you started. Low-cost applications help you gain additional insight. Complex bundles that let you dive deeper into specific technology areas are also available. Many Keysight instruments come loaded with a BenchVue application license at purchase.

PathWave BenchVue software

Activities

- Analyze
- Automate
- Connect and control
- Generate
- Llab management
- Simulate

Instrument compatibility

- DAQ units
- DMMs
- Electronic loads
- FieldFox handheld analyzers
- Function generators
- USB modular products
- Universal counters
- Oscilloscopes
- Photovoltaic array simulators
- Power analyzers
- Power meters and power sensors
- Power supplies
- Signal generators
- Spectrum analyzers
- Network analyzers



Starting price : Free

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