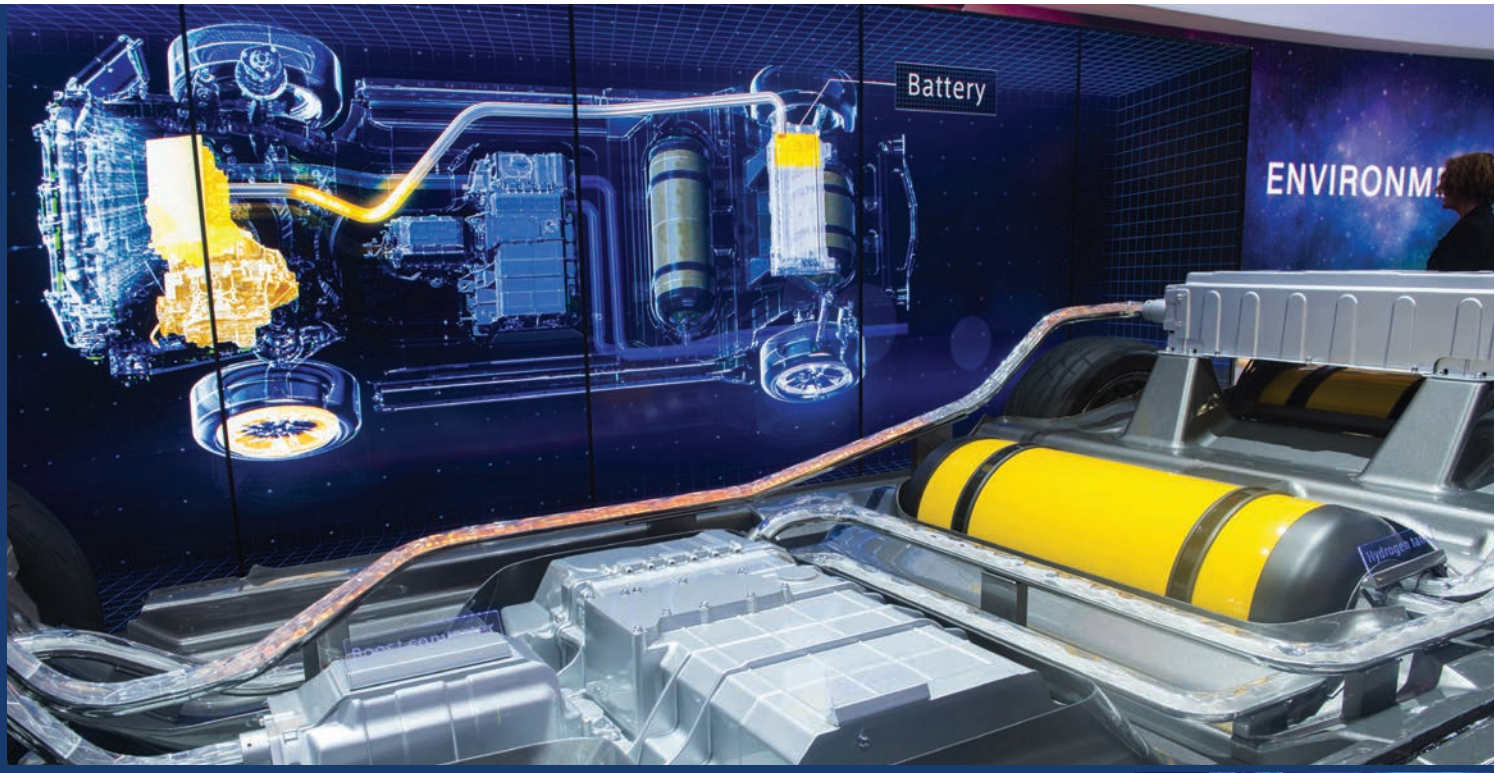
pickering Automotive Test Solutions



Technology and Expertise in Automotive Test

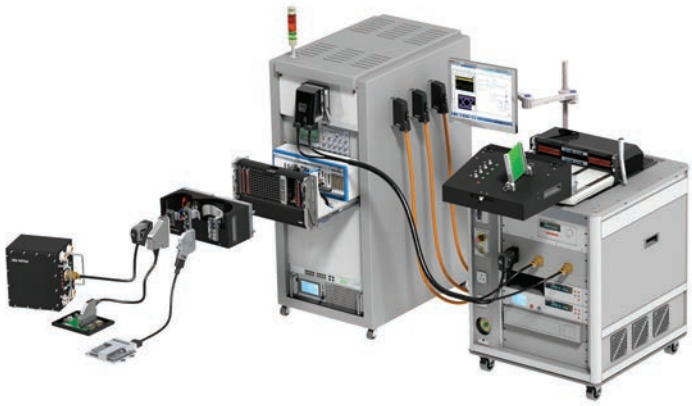
Switching | Simulation | Programmable Resistors | Custom Design | Software | Reed Relays | Connectivity & Cables

pickering**test**.com

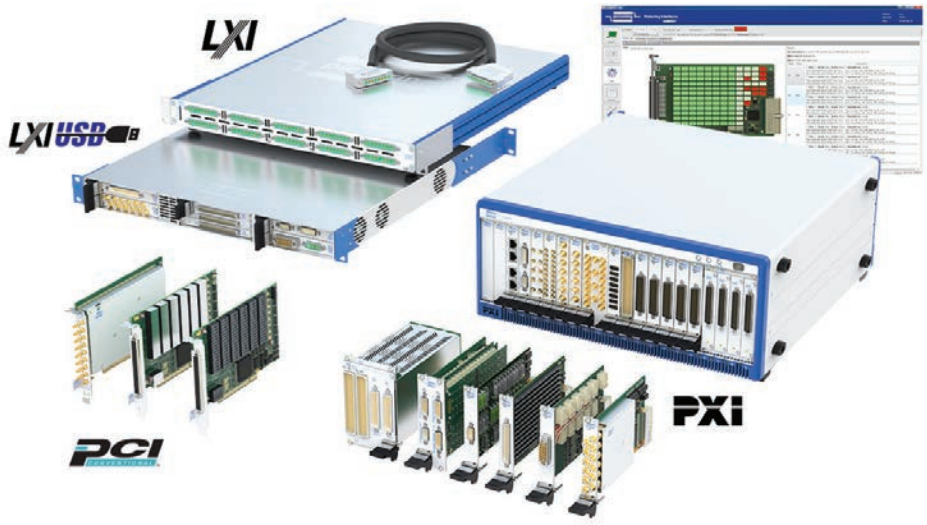
Electronic complexity in automobiles has increased rapidly, making testing these electronic sub-assemblies very challenging. At Pickering, we understand these challenges—since 1988, we have been designing and manufacturing commercial and custom switching systems, as well as instrumentation and simulation products, for automotive test applications ranging from simple body controllers to active safety and infotainment systems.

Our capabilities and expertise are the reasons why major automotive and transportation companies including ***Autoliv, BMW, Caterpillar, Chrysler, Continental, Delphi/Aptiv, Denso, Honda, JLR, Johnson Controls, Kostal, Lear, Magna, Magneti Marelli, Mazda, Mercedes, Nissan, Peugeot, Renault, Robert Bosch, Rolls Royce, Siemens, Tesla, Valeo, Volvo Truck, Yazaki*** and many more specify our PXI, PCI, LXI and USB products for automotive functional test. We have developed a number of modules optimized for the automotive electronics industry and we are focused on ways to make Electronic Control Unit (ECU) testing easier, faster and more reliable.

We have extensive experience with many different automotive applications. These include ABS brake modules, dashboard testing, transmission control, body controllers, airbag squibs, engine management units, automotive networks, BMS testing and many others.



Courtesy Virginia Panel Corporation



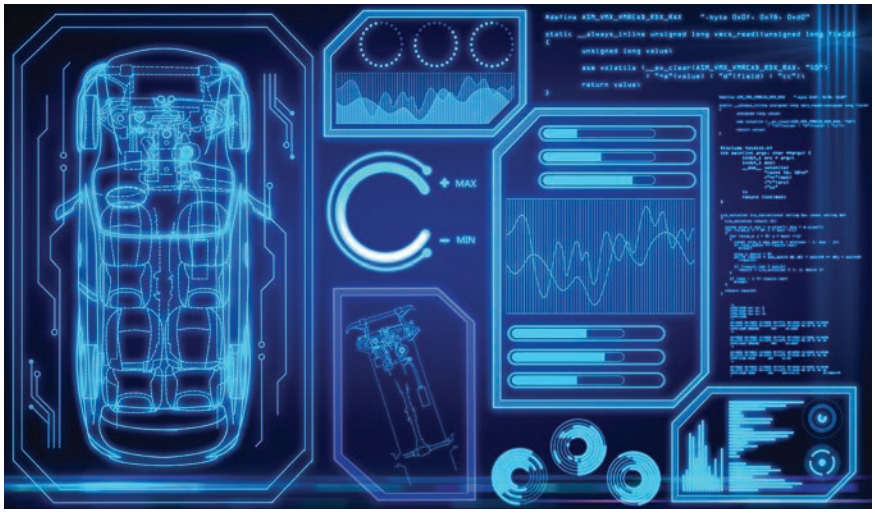
We offer the largest range of switching solutions in the industry for PXI, PCI, LXI and USB applications, with over 1,000 modules in PXI alone, as well as a full range of supporting cables and connectors. These solutions include:

- **PXI Switch and Simulation systems** including switch simulators, fault insertion, strain gauge and resistor networks for automotive applications. Our PXI switching ranges from our BRIC™ high-density switching matrices to RF & microwave and through to high current (to 40 Amps) applications.
- **PCI Switch and Simulation cards** – an alternative for simple lower-cost test applications. Our PCI cards are built using the same basic technology as our acclaimed PXI range utilizing the same software drivers, soft front-panels and control electronics.
- **LXI (Ethernet)/USB switching solutions** – these offer higher densities that cannot be addressed economically with PXI modules. Also, our LXI software drivers work in any programming /OS environment and with other platforms, especially PXI.
- **Supporting cables & connectors** – From simple mating connectors to complex cables assemblies and terminal blocks.
- **Software** – Our commitment to delivering you high-quality products does not just extend to our switching and simulation products. Our software team has created all of our application software packages and software drivers to help you simplify and expedite the development and deployment of your automated test systems.

All of our modules come with a standard 3-year warranty and include guaranteed long-term support. Our products have a history of longevity, typically 15-20 years, which is critical to many of our customers.

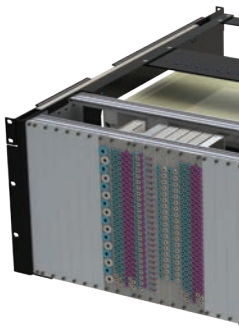
3 Year Warranty

The bottom line, we make it easy for automotive engineers to select the right modules for your applications and integrate them into your test strategy— from concept to end-of-line.
Take a look…



ECU Testing

Virtually all ECUs, from simple body controllers to Engine Management Units (EMUs), need signal switching and sensor simulation for adequate testing. Switching can be high current for motor control and low level for control functions. Temperature and altitude sensors are resistive in nature and are easily emulated for test applications. As Gasoline powered vehicles move toward a 42 V power platform, higher voltage switching needs to be selected. With electric vehicles, 400 to 600 V may be prevalent on ECUs.

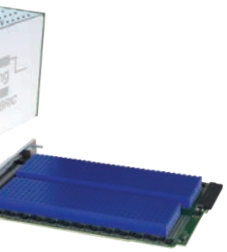


Modular Brea

Hardware-in-the-Loop Simulation (HILS)

HILS can be used to simulate the reaction of an ECU to external fault conditions such as a broken wire or a faulty temperature sensor, giving you the power to thoroughly test the ECU in a virtual environment before proceeding to production level testing. Using our Fault Insertion switch modules, all possible electrical short and open circuits are simulated, erroneous sensor data is applied and the ECU reaction captured to see if the design works as defined. You can achieve greater reliability in a cost-effective manner, no matter how complex the system being tested has become.

For high-speed impedance matched applications, such as automotive networking, we feature specially designed modules such as our PXI and PCI fault insertion switch modules (models 40-200/201 and 50-200/201 respectively) that offer the ability to simulate faults on commonly used differential serial interfaces. These modules are just a small part of our broad range of fault insertion switches designed for testing the response of safety-critical communication systems used in automotive environments.



PCI CONVENTIONAL

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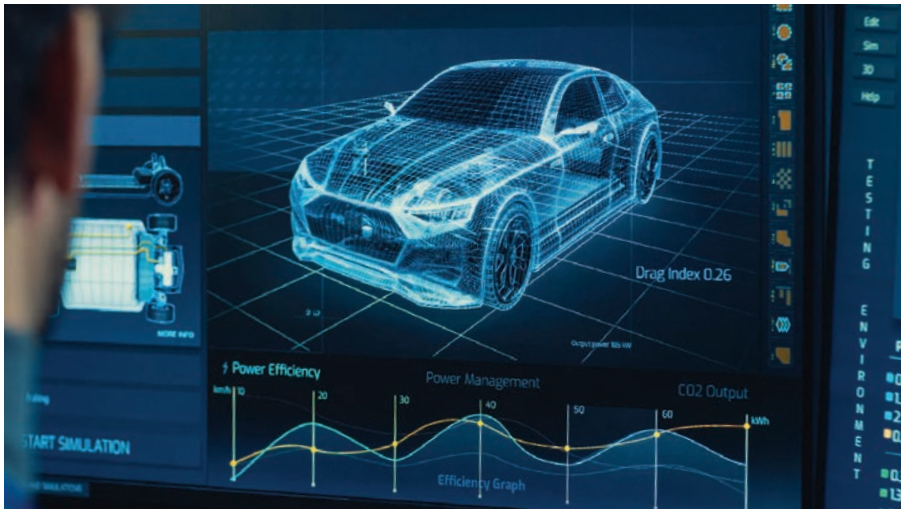
LXI



Sensor and Strain Gauge Simulation

The ability to simulate the resistive nature of many of the environmental sensors in the engine compartment and vehicle cabin is important when it comes to EMU and Body Controller test. When testing ECUs that control airbags, being able to simulate vehicle accelerometers allows the test to verify if the squibs will fire correctly. Pickering has the largest range of programmable resistor solutions, in both PXI and PCI formats, featuring down to 2mΩ resolution on multiple channels with accuracies as high as 0.03%. We also offer the only strain gauge emulators in both PXI and PCI—now you can easily incorporate strain gauge tests on safety related ECUs.

Environmental Testing

Testing of multiple ECUs in an environmental chamber requires the sharing of external instrumentation and resources to stimulate and collect data from the ECUs over the cycles of the test. Our BRIC high-density switching matrices can provide up to 6144 cross-points in eight PXI slots, ranging in sizes from 4 to 32 rows and 10 to 1104 columns. The BRIC's software drivers make it a simple task to integrate into our Switch Path Manager software. In addition, our IVI drivers support National Instruments' Switch Executive. Also, our line of solid state multiplexers and matrices have virtually infinite switch life, making them ideal for extremely long environmental testing.

If you prefer to use an LXI or USB interface, our 1,000+ PXI switch and simulation modules (including the BRIC matrices) can be used in our LXI/USB modular chassis. We also offer high-density LXI matrices (models 60-55X and 65-22X), which have similar functionality to the BRIC matrices and can be operated via an Ethernet connection.

Instrumentation Management

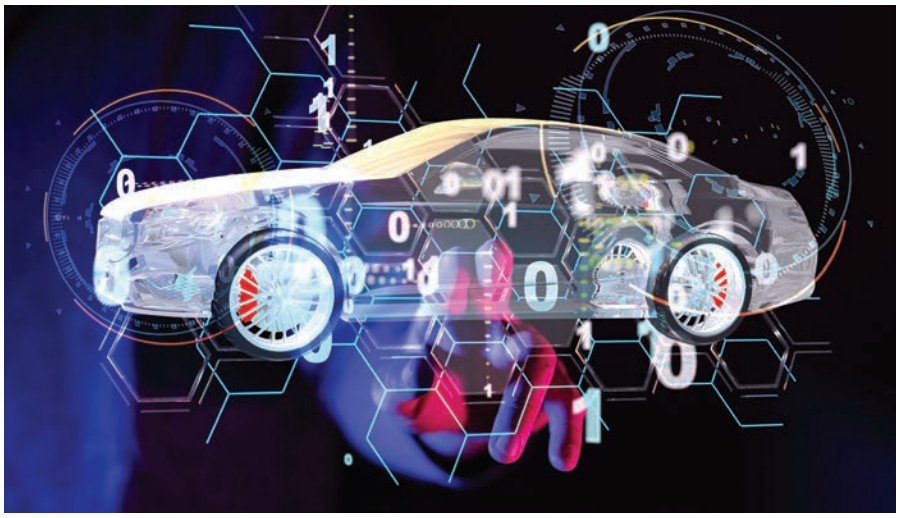
Whether you are testing low-frequency audio channels, Spark Coil Firing Patterns, MOST Fiber channels or the latest satellite radios—we offer signal-switching modules that address each application. SPST relays, multi-pole multiplexers and cross-point matrices are available with voltages up to 1000 VDC and we offer a wide range of RF/Microwave switches with bandwidths up to 67 GHz, as well as fiber optic switching.

Signal Conditioning

Most PXI instruments lack the range needed to generate or capture data to test ECUs. For example, signal or arbitrary waveform generators lack the amplitude necessary to drive signals that simulate peripherals such as camshaft and ABS wheel sensors, and digitizers cannot adequately capture the primary input of a spark plug coil during discharge. Our high voltage amplifier (41-650) features multi-channel, gain selectable amplifiers that work with many instruments including our function generator (41-620). Our high voltage attenuator (41-660) features selectable input ranges that accept up to 600 volt waveforms.

RF and Microwave

The increasing feature sets of automobiles often require the use of RF components. Features such as Bluetooth, video, adaptive cruise control and 5G for autonomous vehicles call for RF and Microwave switching in test. We offer RF solutions ranging from 500 MHz to 67 GHz, so we can address the vast majority of your RF and Microwave applications with our standard offerings.



Switch Simulation

When testing body controllers, an important test is to see if the inputs respond to switches that are dirty and do not present a normal open/closed resistance. Our switch simulation module (40-480) is designed to simulate the operation of up to 32 automotive switches where dirty contacts or leaking current can be expected from switch contamination brought on by age. The switch simulation allows automotive I/O devices to be tested for correct operation under adverse conditions.

Electric Vehicle Battery Management Systems Test

With the increasing adoption of electric propulsion systems in road vehicles, one of the major challenges to be tackled is the effective testing of the Battery Management Systems (BMS). We offer our battery simulator module (41-752) to facilitate BMS testing.

Take a look at our customer success story: "Developing a PXI solution for testing automotive battery management systems".

Automotive Load Management

The testing of ECUs such as body controllers, ABS, electric power steering and transmission control requires the connection of high current loads to the Unit Under Test (UUT). We provide a wide range of PXI switch modules that can support up to 40 Amp load switching within the PXI chassis. For higher current requirements, our digital I/O and relay driver modules (40-410, 411, 412) let the test system control relays that are not easily supported within the PXI chassis. In addition, our PXI load resistor modules (40-292) provide programmable loads up to 15 watts within our PXI and LXI/USB modular chassis. Also, our LXI matrix (60-600) can switch 10 Amps across up to 64 channels.

Software Drivers and Applications

We provide driver packages for all our switch and simulation products offering seamless installation and support of all popular programming languages and operating systems, including Linux and several real-time operating systems (RTOS) . We are also committed to making it easier to develop test programs and to maintain your test stations using our Soft Front Panels.

Diagnostic Test Tools

These tools, BIRST - Built-in Relay Self-Test and eBIRST Switching System Test Tools, will quickly test a switch system, locate faulty relays and show you what relays to replace via a graphical output

Sequence Manager Software

This sequencing service allows a user to define and store sets of switch and simulation states in our LXI/USB products, including the 1000+ PXI switch and simulation modules supported by our LXI/USB modular chassis. The sequences may then be executed via user specified software and hardware triggers.

Switch Path Manager (SPM) Signal Routing Software

Simplify signal routing through switching systems and speed up the development of switching system software. SPM supports our switching modules and the interconnection between them.

Cable Design Tool – Create custom cabling with our free online tool

Design custom cables by using either a built-in library of standard cable sets or create from scratch. The free on-line tool allows you to store designs and develop over time, creates a PDF document detailing specifications and allows very detailed design characteristics.

PXI & LXI Simulation Tools

These tools help you to accelerate the development process by simulating the product in your test system. They allow you to develop and test the system software independent from your application hardware.

About the Pickering Group of Companies

Switching Expertise in Automated Test for Over 50 years

Enhance your engineering team's effectiveness by working with the collaborative, creative and agile culture of the Pickering Group of Companies. We offer products and services to streamline the development, deployment and sustainability of your high-performance electronic test and verification systems. These include relays, switching, simulation, software, cabling, custom design and more.

As the switching and simulation division of the group, Pickering Interfaces can help design, deploy and sustain your test systems. We offer modular PXI, PCI, LXI and USB signal switching and simulation, cabling, application software and software drivers along with the expertise you need to help you get the job done, on time and on budget.

To learn more about the Pickering Group of Companies, please visit the website at: pickering-group.com

Support

Many of our customers expect their test systems to last at least as long as the products being tested. We understand this need and pride ourselves on the fact that all of our critical components, software and cabling designs as well as our manufacturing processes are carried out in-house. These capabilities enable us to provide our customers with guaranteed long-term support and low obsolescence.

We strive to support our customer's needs long-term by:

- Supporting our manufactured products for 15-20 years from date of delivery
- Free software support for the life of the product
- A network of experienced application engineers available worldwide
- Continually updating our product lines, so even if a product happens to become obsolete, we will endeavor to provide an improved version
- Manufacturing older revision products to special order for compatibility purposes, on a best effort basis. If we can't manufacture the identical product—we will strive to offer you a functionally equivalent alternative
- Offering a repair service – all repairs of Pickering Interfaces products are on a return to factory basis. Repairs out of the standard 3-year warranty period are charged solely on the actual parts and labor required, not on a standard or fixed fee or list price percentage basis. To learn more, go to pickeringtest.com/support/repair-policies
- Providing you a Support Knowledgebase, take a look: pickeringtest.com/kb

We've got your Automotive Test Needs Covered!

With our technology and long-term expertise in automotive test, we have your automotive needs covered. Considering the broad range of switching and simulation products in our catalog, it is no wonder most major automotive electronics manufacturers specify Pickering for their test systems.

Challenge us to solve your application problems.

Global Operations

Pickering serves many industries including aerospace & defense, automotive, power generation, energy and commercial electronics. Pickering operates globally with direct operations in the US, UK, Germany, Sweden, France, Czech Republic and China—with additional representation in countries throughout North America, Europe and Asia.

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