



# Aerospace Test Solutions



Technology & Expertise in Aerospace & Defense Test



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



The aerospace and defense industries have some of the toughest electronic testing requirements of any industry. Test engineers face intense demands to find the most advanced test technologies so they can design and implement critical test and measurement systems. At Pickering, we understand these challenges—since 1988, we have been designing and manufacturing commercial and custom switching and simulation systems for aerospace and defense applications, ranging from General Purpose switching, Fault Insertion for Hardware-in-the-Loop Simulation, to RF/ Microwave switching up to 67 GHz .

Our capabilities and expertise are the reasons why major aerospace, and defense companies such as **Lockheed Martin, Boeing, Northrop Grumman, Honeywell, Orbital Sciences, Rockwell Collins, BAE Systems, Ball Aerospace, NASA, Airbus** and many more specify our PXI, PCI, LXI and LXI/USB products for their functional test needs.

Pickering has extensive experience with many different aerospace and defense applications including aircraft lightning protection testing, HASS testing, and satellite payload testing.

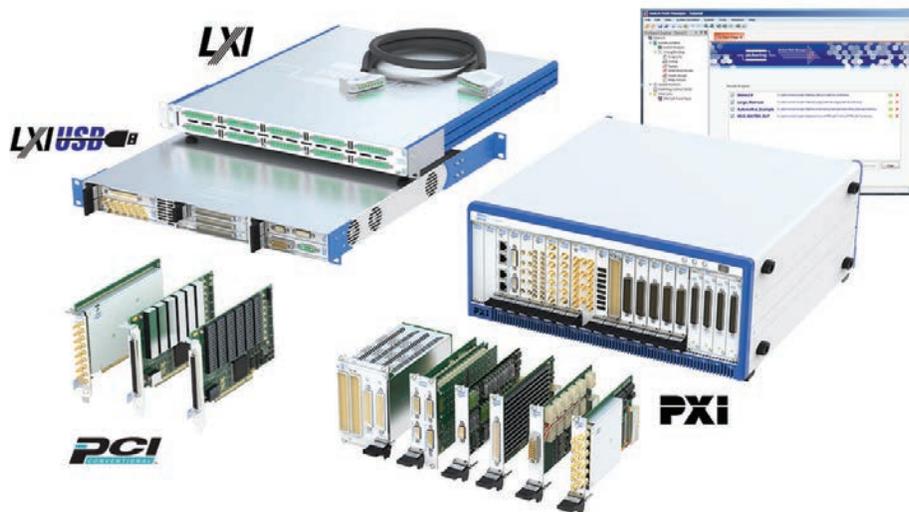
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All of our modules come with a standard 3-year warranty and include guaranteed long-term support. Our products have a history of longevity, typically 15-20 years, which is critical to many of our customers.



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*The bottom line, we make it easy for Aerospace 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...*



We offer the largest range of switching & simulation products in the industry for PXI, PCI, LXI and USB applications, with over 1,000 modules in PXI alone, as well as chassis and a full range of supporting cables and connectors. We also consistently invest in our product development program, especially in PXI, PXIe and LXI and will continue to do so.

These products include:

- **PXI Switch and Simulation systems** including fault insertion, strain gauge, and resistor networks for Aerospace applications. Our PXI/PXIe switching ranges from our BRIC™ high-density switching matrices, MIL-STD-1553 multiplexers and RF & microwave to high current (to 40 Amps) and high voltage (to 1kV). Our PXI/PXIe simulation ranges from LVDT/RVDT/resolver and thermocouple simulators to RTD and programmable resistance modules.
- **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** 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.
- **PXI, PXIe, LXI and LXI/USB chassis** – we offer a variety of PXI chassis and PXI Express (PXIe) chassis available in 8 to 19 slots and different performance characteristics. Our LXI chassis can host our range of 3U PXI switching and simulation modules in an LXI environment, allowing remote control over a gigabit Ethernet connection. Additionally, our LXI/USB Chassis support up to six PXI modules and can be controlled via USB or Ethernet.
- **Supporting cables & connectors** from simple mating connectors to complex cables assemblies and terminal blocks.
- **Software** – 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.



**PXI**

## VXI to PXI Migration

The Aerospace and Defense industries were early adopters of modular test platforms. One of the first successes was VXI, and it has served these industries very well for more than 20 years. Now as VXI test systems become obsolete, test systems developers look to PXI as the next generation modular platform for their industries. The breadth of switching and instrumentation available in PXI makes the choice relatively easy. However, the issue of migrating test programs from VXI to PXI, specifically in switching applications, is of concern. The ability to replicate original test configurations to support legacy FRUs (Field Replaceable Units) is important to continue supporting older test programs while planning for future requirements.

We have developed PXI switching and simulation modules that can replicate existing VXI products to make your job of integration that much easier. And our policy of supporting our PXI products for 15 to 20 years, and even longer, means that your next-generation test systems will have as long a life as their predecessors. Go to [pickeringtest.com/vxitopxi](http://pickeringtest.com/vxitopxi) for cross-references to popular VXI switching modules.

## Aerospace Load Management

The testing and verification of aircraft electrical and electronic systems often requires the connection of high current loads to the UUT (Unit Under Test). We offer a wide range of switching modules that can support up to 40 Amp load switching within a PXI or modular LXI chassis. For higher current requirements, our Relay Driver modules allow the test system to control external relays.

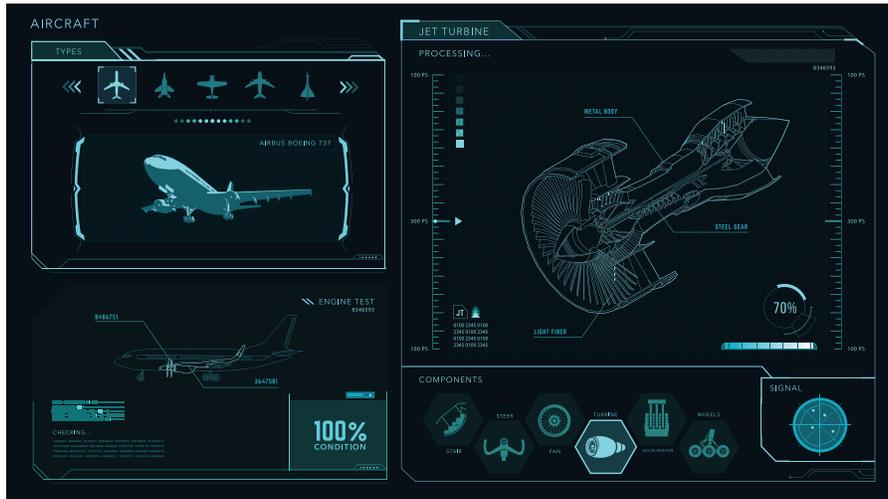
## Instrumentation Management

Whether you are testing low signal levels or higher frequency signals, in applications like fire control systems, RADAR, or avionics equipment, Pickering has signal-switching modules that address each application. These include uncommitted relays, multi-pole multiplexers and cross-point matrices that are available with voltages up to 1000 Vdc and bandwidths up to 67 GHz. Fiber Optic switching is also available.



Modular Bre





Breakout System

## Environmental Testing

Testing of complex aerospace systems in an environmental chamber requires the sharing of external instrumentation and resources to stimulate and collect data from UUT over the programmed cycles of the test. Our BRIC™ PXI matrices can provide over 6,000 crosspoints in eight PXI slots with configurations up to 1008 x 6 and 384 x 16. For extremely long test cycles, our solid state multiplexers and matrices have virtually unlimited life and no switch bounce. If you desire a matrix to operate outside of a PXI chassis, our LXI high-density matrices (60-55X & 65-22X) have similar functionality to our BRIC PXI matrices and can be operated via an Ethernet connection.

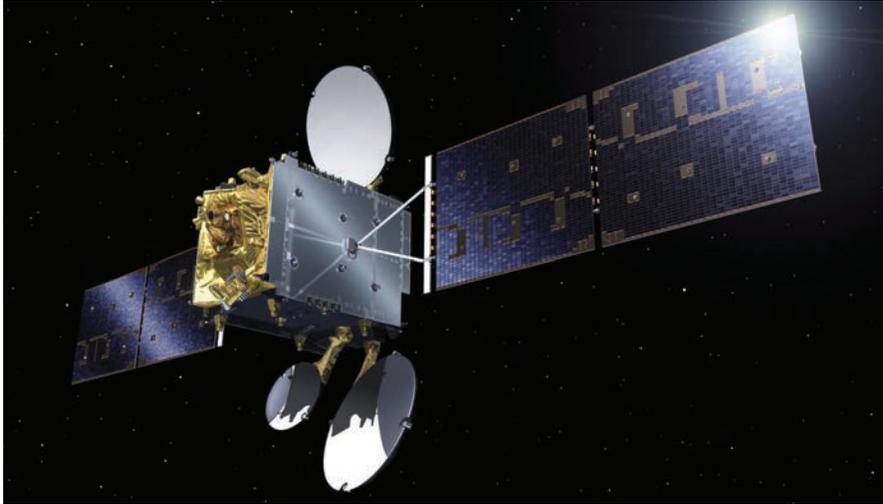
## Hardware-in-the-Loop Simulation (HILS)

With pressure on product lead times and the need to reduce development costs, simulation can be an important tool in the engineer's tool set but only so much can be done through the use of computer simulation. Hardware-in-the-Loop simulation adds to the simulation tools by including real pieces of hardware in the system that are representative of the overall product design. By emulating sensors, solenoids, power sources and other devices, a more real representation of product hardware can be simulated and can be tested for response under different conditions. More development work can be completed concurrently with the product development, speeding up time-to-market and reducing the debug time in control systems.

Pickering Interfaces manufactures devices that emulate sensors and I/O devices that interface with control systems. Support for real-time operating systems, such as LabVIEW RT and MATLAB SimuLink, ensures that users can control these devices in accurate and predictable ways to ensure the response is as close as possible to the hardware environment under development. To complement sensor and I/O solutions, we provide a wide and expanding range of fault insertion and signal conditioning devices.

Our HILS products include modular Breakout Systems, Fault Insertion Testing and Sensor Simulation. For high-speed impedance matched applications, we also feature specially designed Fault Insertion modules for high-speed serial data that forms part of our range of PXI fault insertion switches, by far the largest selection in the industry.





## Sensor Simulation

The ability to accurately simulate the resistive nature of many of the environmental sensors in aerospace applications is important when it comes to product test and verification. When testing FRUs like FADECs, the ability to simulate altitude, pressure and temperature sensors is crucial. These include:

- **Programmable Resistors** - including RTD simulators and load resistors
- **Strain Gauge Simulators**
- **Thermocouple Simulators**
- **LVDT/RVDT/Resolver Simulators**
- **Analog Output/Current Loop Simulators**

## Digital I/O

An expanding range of digital I/O modules allows users to emulate and measure UUT I/O signals or directly control the solenoid coils of high current relays. Our modules have fully protected outputs that can withstand high current and voltage surges without damage and include thermal protection that ensures that even long-term connection to a faulty load will not cause instrumentation damage. Our digital inputs feature adjustable dual thresholds that allow users to easily establish if a digital input is in a low, high or indeterminate state. Their high input voltage capacity makes them an excellent choice for monitoring systems working from high voltage power supplies commonly found in aerospace applications. Several models are designed for applications requiring optically isolated digital I/O, typically in industrial automation.





## Signal Conditioning

Many PXI instruments lack the range needed to generate or capture data to test Aerospace and Defense FRUs. For example, signal or arbitrary waveform generators lack the amplitude necessary to drive signals that simulate peripherals. 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 use of RF components in Aerospace and Defense calls for specialized switching. Testing SDRs (Software Defined Radio) and RADAR systems 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. We also offer **Turnkey LXI Microwave Switch & Signal Routing Subsystems** - we are able to take high-level requirements and turn them into a fully integrated and supportable end product.





### **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.



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**We Can Help You  
Design, Deploy & Sustain Your Automated Test System**

*Enhance your engineering team's effectiveness by working with the collaborative, creative and agile culture of Pickering. We offer products and services to streamline the development and deployment of your high-performance electronic test and verification systems*

*With our technology and long-term expertise in Aerospace test, we have your needs covered. Challenge us to solve your application problems.*

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### 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](http://pickeringtest.com/support/repair-policies)
- Providing you a Support Knowledgebase, take a look: [pickeringtest.com/kb](http://pickeringtest.com/kb)



PICKERING ELECTRONICS  
**Reed Relays**



PICKERING INTERFACES  
**Switching & Simulation**



PICKERING CONNECT  
**Cables & Connectors**

## 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.

Headquartered in the United Kingdom, we have two manufacturing facilities—in the UK and the Czech Republic. We also have sales and support offices located throughout Asia, Europe and North America.

To learn more about the Pickering Group of Companies, please visit the website at: [pickering-group.com](http://pickering-group.com)



# 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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