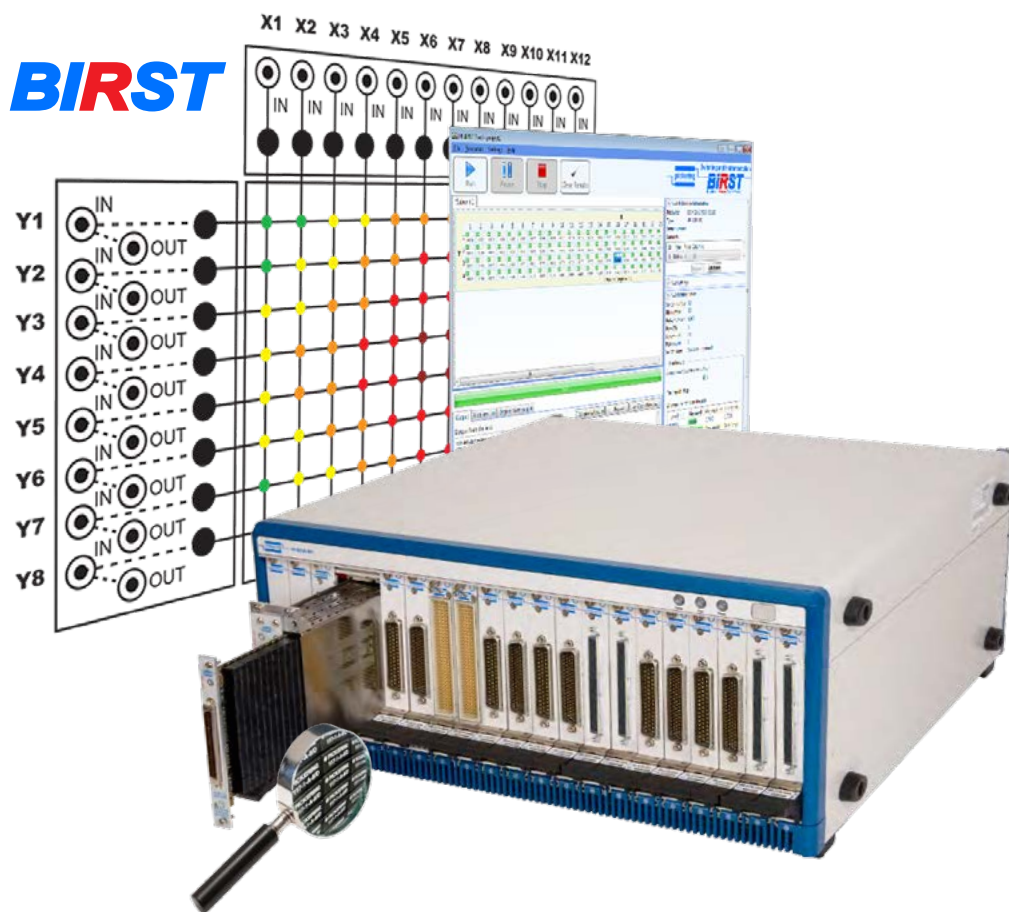# *BIRST*™ (Built-In Relay Self-Test)

- Full diagnostic self-test of complete PXI and LXI matrix modules

- Detection of welded, open circuit or high resistance relays

- No external instrumentation or special skills required

- Minimize matrix downtime and time to repair

Verification and diagnosis of complex switching operation in a test system has always been an issue. The *BIRST* (Built-In Relay Self-Test) diagnostic test tool, available on some of our LXI and PXI switch matrices, provides a quick and simple way of finding relay failures. *BIRST* allows you to easily check system switching operations on command, identifying any relay failures in the switch module.

BIRST, introduced in 2009, requires no purchased external tools; it simply requires the installation of the free software on a Windows controller that manages the measurement system and the switch path routing while the matrix is tested. All of our PXI and LXI products that include *BIRST* contain all the hardware required to support testing; all you need to do is disconnect the test system from the switching system connector(s) and simply run the test.

Consider the Alternatives

If another supplier provides your switching system, you will have to first establish what sub-assembly or module is faulty, then test the individual modules to find which relay has failed. You can do this manually, consuming hours of engineer or technician time, or you can try to write your own self-test program to provide a diagnosis – again consuming hours of time gaining knowledge of both the test system and switching system. Even so, there is always the risk of an incorrect diagnosis leading to the wrong components being replaced, causing unnecessary stress on the switching system parts. With *BIRST*, all this is unnecessary. It requires no upfront investment, just choose a module and run the tests. The modules that contain *BIRST* are clearly marked on both our website and data sheets.

|	*BIRST*	**Manual or System Test**
Equipment required	None, built into the matrix	None if already part of the system
User software investment	None, application program provided	Responsibility of user or integrator
Cost	None, built into matrix	High software investment for each test system requirement
Ease of fault identification	Simple, tool finds the specific relay at fault and the manual can be used to find its physical location in the switching system	Typically restricted to identifying a faulty path, user then needs to identify what has caused the failure using the manual
Fault coverage	Covers only matrix core, cannot test non matrix architectures	Typically identifies only a general indication of fault paths, will include cable faults but unable to distinguish them from relay faults easily
Repair time	Short as tool has identified the matrix faults	Long as the user has to resolve the cause of the problem
Chance of misdiagnosed repairs	Low if in matrix	Significant risk
Downtime	Short if the fault is in a matrix	Long, especially if the fault leads back to switching system vendor repair

BIRST works by measuring path resistances through the matrix using an embedded measuring circuit and an access point normally isolated from the matrix by isolation relays. An application program measures the paths available and explores the matrix to locate relays that have unusual characteristics.

Once completed, the program lists all the relays that are defective and the *BIRST* Soft Front Panel shows their X and Y coordinates. The equipment manual can be used to identify the location of the relay, all of our manuals provide the required lookup tables to physically locate relays.
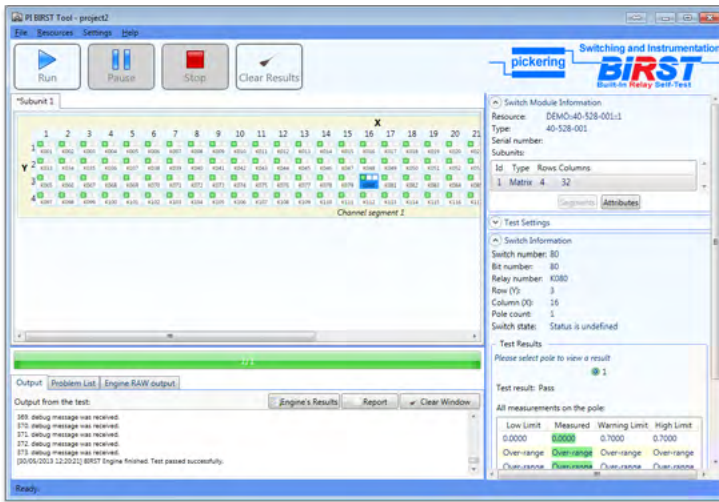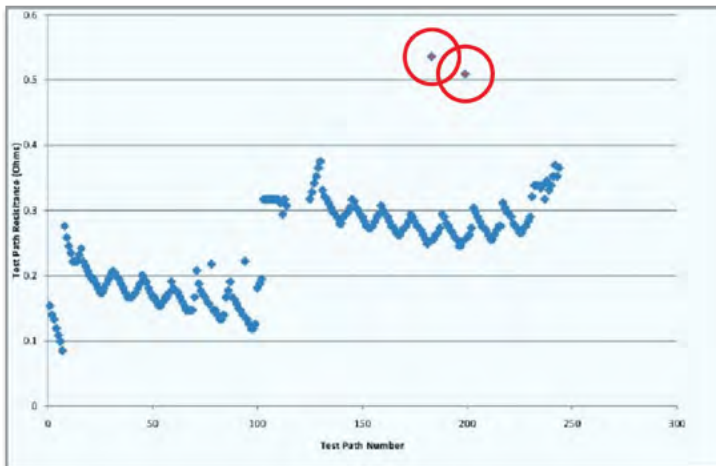
BIRST Soft Front Panel
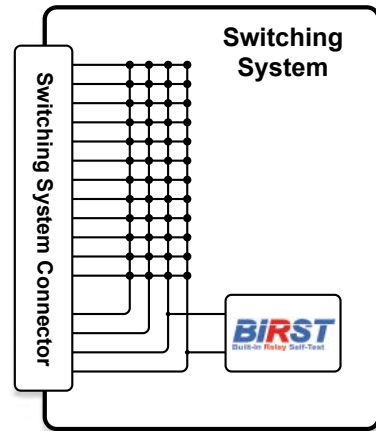
Connection of *BIRST* within a switching system

Output file from *BIRST* tests on a typical matrix manipulated to plot path resistance for different paths tested showing two relays with unusual characteristics

Along with *BIRST* we also offer our *eBIRST™* switching system test tools; the *eBIRST* tools offer a means of testing a wider range of our switching architectures using a set of external tools. Only Pickering offers a range of diagnostic test tools to reduce the cost of owning a switching system. To learn more about both of these tools, please visit our website (pickeringtest.com/diagnostic-tools).

Knowledgebase

More information on the principles behind our *BIRST* and *eBIRST* diagnostic test tools can be found on our Knowledgebase at: **wiki.pickeringtest.net/eBIRST+and+BIRST**.

Example Matrices with *BIRST*

**BRIC™ High-Density PXI Matrices
with up to 4416 Crosspoints**
40-560A – 563A

**BRIC High-Density PXI Matrices
with 2 Amp Current Handling**
40-565B/566A

**16x8 & 32x4
2-Pole PXI Matrices**
40-518A/519A

**64x2, 32x4 & 16x8
1-Pole PXI Matrices**
40-527/528A/529A

**64x4
1 or 2-Pole PXI Matrix**
40-533B

**16x16
2-Pole PXI Matrix**
40-582

**128x2, 64x4 32x8 & 16x16
1-Pole PXI Matrices**
40-584/585/586A/587A

**High Density LXI Switching Matrices
with up to 4096 Crosspoints
and 2A Current Handling**
60-550 – 556

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