Solutions for Today’s Data Acquisition and Control Challenges
Optimize your test and automation system with MULTIPOINT MEASUREMENT & CONTROL CAPABILITIES

Ask us how our data acquisition solutions can slash your time to market.
Keithley offers data acquisition solutions for applications that include production testing, process automation and control, and research and development. Whether the application is in the lab or on the production floor, Keithley offers solutions in a variety of form factors, from plug-in boards to external systems with multipoint measurement and control capabilities. The high quality, high performance, and economical price of these solutions help you improve your productivity and ensure a great return on investment.

**Easy to use**

- **Easy to install** with plug-and-play hardware and software
- **Easy to prototype and troubleshoot** with start-up software
- **Easy to program** with state-of-the-art software drivers for developing application software quickly
- **Easy to upgrade** hardware with a consistent programming interface that makes code modifications unnecessary

**Reliable**

- **Specifications** spell out how Keithley products will work in a system—from board to cable to accessory

**Robust**

- **Dependable operation** that keeps systems running

**Outstanding technical support that’s unmatched in the industry**

- **Our experts can help** with system building and optimization
Complete line of data acquisition boards for building powerful systems

Outstanding mix of functionality, performance, and value

Keithley offers PCI, ISA, and PCMCIA boards to match a variety of computer hardware. These boards offer a wide range of functionality, including analog I/O, digital I/O, and counter/timers. Visit www.keithley.com for detailed specifications on any Keithley product.

Multifunction Analog I/O

These multifunction boards make it simple to gather analog data, read and output digital signals, provide analog stimulus, count events, and much more. System integrators, OEMs, production engineers, and control engineers also use these all-in-one solutions to control closed-loop processes by switching relays and controlling setpoints.

Key Features:
- 12- and 16-bit A/D resolution
- 16 to 64 analog inputs channels with gains up to 800 (+12mV range)
- Up to 1.25MHz sampling rate
- Automatic CJC for thermocouples
- Up to two waveform-quality analog output channels
- Up to 32 digital I/O lines
- Up to 3MHz digital I/O streaming

Typical Applications:
- Voltage, temperature, strain, vibration, and other analog signal measurements
- Analog stimulus/response testing
- Waveform generation and analysis
- Spectrum analysis
- Transient analysis
- Relay control
- Switch closure sensing

Digital I/O

System integrators and OEMs use our digital I/O products to control processes, monitor the status of switches, contacts, and other control points, turn power on and off, and meet high channel count requirements.

Key Features:
- Up to 96 digital I/O lines
- Configurable for input or output
- 64mA current sink capability
- Interrupt and latching capabilities
- Compatible with industry standard solid-state relays and PB-24/SSIO-24

Typical Applications:
- Interface to TTL, NMOS, and CMOS components
- Factory automation
- Contact closure sensing
- Status monitoring and control of switches, LEDs, pushbuttons, valves, limit switches, etc.
- Energy management
- Security systems monitoring and control

Analog Output

Control and process engineers use Keithley analog output boards to control valves, gauges, ovens, gates, and other analog devices that require voltage or 4-20mA current. They also use them to simulate outputs from other devices and generate arbitrary waveforms.

Key Features:
- Up to 16 analog outputs
- 20mA output current
- Up to 20-bit resolution
- 4-wire remote sensing
- Automatic fault-circuit detection
- Up to 32 digital I/O lines

Typical Applications:
- Burn-in
- Machine control and automation
- Servo and setpoint control
- Programmable voltage source
- Control 4-20mA loads without external power supply
- Excitation voltage

<table>
<thead>
<tr>
<th>Description</th>
<th>Key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Inputs</td>
<td>A/D Resolution</td>
</tr>
</tbody>
</table>
Counter/Timers

Production engineers and OEMs use Keithley counter/timers in applications as complex as determining the position of a crankshaft or as simple as counting the number of products on an assembly line.

**Key Features:**
- Up to 10 counter/timers
- Interrupt capabilities
- Digital pattern recognition
- 32 digital I/O

**Typical Applications:**
- Position measurement
- Event counting and gating
- Time, frequency, and period measurement
- Pulse train generation
- Frequency generation

Keithley’s specifications tell you exactly what to expect when building our products into a system. Visit [www.keithley.com](http://www.keithley.com) for complete specifications and further information on our PCI, ISA, and PCMCIA boards and accessories.

<table>
<thead>
<tr>
<th>Multifunction Analog I/O</th>
<th>Digital I/O</th>
<th>Analog Output</th>
<th>Counter/Timers</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPCI-3107/3108</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPCI-1801HC/1802HC</td>
<td>KPCI-3101/3102</td>
<td>KPCI-3103/3104</td>
<td>KPCI-3110</td>
</tr>
<tr>
<td>Multi function, all-in-one board</td>
<td>High channel count</td>
<td>Low cost, entry level</td>
<td>Medium cost, higher speed</td>
</tr>
<tr>
<td>• High resolution</td>
<td>• Up to 64 channels</td>
<td>• 225kHz, 12-bit</td>
<td>• 400kHz, 12-bit</td>
</tr>
<tr>
<td>• Waveform-quality analog output</td>
<td>• Burst mode support up to 512kHz</td>
<td>• High-speed, digital I/O, up to 3MHz</td>
<td>• High-speed digital I/O, up to 3MHz</td>
</tr>
<tr>
<td>• Wide gain up to 800</td>
<td>• High gains up to 250</td>
<td>• 4 counters</td>
<td>• Up to 32 analog input channels</td>
</tr>
<tr>
<td>• Thermocouple/ CJC solution</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 16 | 64 | 16 | 16 | 32 | 32 | - | - |
| 16 bit | 12 bit | 12 bit | 12 bit | 12 bit | 16 bit | - | - |
| 100kHz | 33kHz | 225kHz | 400kHz | 1.25MHz | 250kHz | - | - |
| 800 | 250/8 | 8 | 8 | 8 | 8 | - | - |
| 0/2 | 2 | 0/2 | 0/2 | 2 | 2 | - | 8/2 |
| 16 bit | 12 bit | 16 bit | 16 bit | 12 bit | 16 bit | - | 20 bits |
| 32 | 12 | 23 | 23 | 16 | 16 | 24/96 | 32/0 |
| 64mA | 4mA | 12mA | 12mA | 24mA | 24mA | 64mA | 64mA/- |
| -15mA | -40μA | -15mA | -15mA | -15mA | -15mA | -15mA | -15mA/- |
**Integra Systems: High channel count at a very low cost per channel**

**Up to 200 channels**

The Model 2700 and 2750 are high performance data acquisition and control systems that provide maximum flexibility at a minimum cost. Both of these highly integrated systems include a true 6½-digit multimeter, a state-of-the-art integrating A/D, and signal conditioning. Their intuitive front panel design makes troubleshooting easier. Production, quality, and research engineers often use Integra systems to characterize and profile their systems and to perform final functional tests on their products.

**Key Features:**
- Up to 200 channels of differential analog inputs
- Built-in signal conditioning directly measures temperature (thermocouple, RTD, thermistor), voltage AC/DC, current AC/DC, resistance (2- and 4-wire), frequency, and period
- Up to 160 digital I/O lines
- 22-bit high resolution integrating A/D
- Per channel configurability, scaling, and alarm limits
- Built-in 1000V/300V electrical isolation
- Flexible modular configuration
- 200 channels per second scanning rate
- RS-232 and GPIB communication standard

**Typical Applications:**
- Process monitoring and control
- Production testing of electronic products and devices
- Burn-in, accelerated stress testing (AST)
- Low ohms, multichannel measurements

**Highly flexible**—when the application’s needs change, simply change modules. Integra systems reconfigure themselves automatically.

<table>
<thead>
<tr>
<th>Module</th>
<th>7700</th>
<th>7701</th>
<th>7702</th>
<th>7703</th>
<th>7705</th>
<th>7706</th>
<th>7707</th>
<th>7708</th>
<th>7709</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC and DC Volts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC and DC Current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T/C w/Automatic CJC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T/C w/External CJC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermistor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance (2- or 4-wire)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event/Counter/Totalizer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Routing/Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog Input Channels</td>
<td>20</td>
<td>32</td>
<td>40</td>
<td>32</td>
<td>40</td>
<td>20</td>
<td>10</td>
<td>40</td>
<td>6x8</td>
</tr>
</tbody>
</table>

All modules are compatible with the two-slot Model 2700 Multimeter/Data Acquisition System and the five-slot Model 2750 Multimeter/Switch System.
Intuitive software tools speed and simplify system building

**Step 1:** Install hardware and driver software
Easy installation—just point and click.

**Step 2:** Prototype and debug the system with Keithley’s free “Up & Running” software
No programming required. Exercise and verify all analog and digital I/O functions with the start-up software and TestPoint runtimes.

**Step 3:** Use Keithley’s turnkey application software or develop a custom application in your favorite programming language

**Turnkey applications**
No programming needed to
- Acquire data directly into Excel with ExceLINX™
- Capture, plot, and analyze waveforms with VisualSCOPE™

**Custom application development**
- Software drivers based on ActiveX® controls and DLL controls simplify writing hardware-independent software in Visual Basic, C/C++, Delphi, TestPoint, LabVIEW, and LabWindows/CVI

---

**Select the optimum software for your hardware**

<table>
<thead>
<tr>
<th>Software Categories</th>
<th>PC Plug-In Boards</th>
<th>Model 2700 and 2750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise/debug/prototype software</td>
<td>DriverLINX test panel</td>
<td>TestPoint runtimes</td>
</tr>
<tr>
<td>Turnkey application software</td>
<td>ExceLINX-DAS, VisualSCOPE</td>
<td>ExcelLINX-1A</td>
</tr>
<tr>
<td>Custom program development tools</td>
<td>DriverLINX, ActiveX controls and DLL for Visual Basic, Visual C++, and Delphi. Also, TestPoint and LabVIEW drivers</td>
<td>PVI drivers for TestPoint, LabVIEW, LabWindows/CVI, Visual C++, Visual Basic, and others</td>
</tr>
</tbody>
</table>
Data Acquisition and Control Handbook

This valuable 200-page reference brings together Keithley’s experience in helping customers with data acquisition and control applications. It provides objective recommendations on designing test circuits, software programs, and common test and automation systems. To request a FREE copy, visit www.keithley.com or call 1-888-KEITHLEY (534-8453).

Application notes and articles

Visit www.keithley.com to download an extensive library of applications notes and articles that offer practical, real-world answers to data acquisition questions.

Dependable service and applications support

Service and support, both before and after the sale, from Application Engineers who are experts in their fields are all part of the package when you work with Keithley. Ask them for advice on the best way to configure a system or for answers to tough test, measurement, and data acquisition questions. Contact them through www.keithley.com or call them at 1-888-KEITHLEY (534-8453). Keithley’s international offices provide native language support in countries around the world.

Get the whole story in Keithley’s catalog

See Keithley’s catalog for complete descriptions of our test, measurement, and data acquisition solutions. Call 1-888-KEITHLEY (534-8453) or visit www.keithley.com to request a FREE copy.

A greater measure of confidence

Keithley is a pioneer in the data acquisition industry. For more than 50 years, we’ve been developing state-of-the-art test, measurement, and data acquisition products. Our partnerships with the leading manufacturers in optoelectronics, telecommunications, semiconductors, and other industries allow us to create innovative solutions for evolving test and measurement needs.