# TestPoint™

- **Database toolkit—direct access to all popular database packages**
- **Internet toolkit—monitor/control from your Internet browser**
- **32-bit Windows 95/98/NT/2000/Me/XP support**
- **Works with IEEE-488 instruments, RS-232 and RS-485 devices, and data acquisition boards and cards from Keithley**
- **Includes 100s of instrument-specific libraries**
- **Free run-time creation and distribution included**
- **Open environment:**
  - **DDE data pipeline and OLE to other Windows applications**
  - **DLL custom functions through Windows-language program**
  - **OCX and ActiveX custom controls from a number of vendors**
- **Flexible, high-resolution graphics with sliders, selector buttons, stripchart, graphing, labeling, and annotation; design your own live switches**
- **Built-in analysis with trigonometric, statistical, logical, curve fitting, frequency, and time domain functions**
- **Takes care of details such as automatic data type handling and syntax**
- **Security feature enables password protection for all or part of an application**
- **Error handling for tests that need to run overnight**

# Test & Measurement Development Package
## for Plug-In Boards and Instrument Control under Windows

TestPoint lets you build complete applications quickly and easily without drawing, connecting, or wiring icons, or writing lines of code. You program in the same way you might describe your application to someone else! Simply drag and drop objects representing graphs, displays, and other parts of your test in a display panel. On an Action List, list the things you want your test to do. TestPoint builds the code to run your test and provides you with a description of the test.

TestPoint is equipped with features for controlling external devices, responding to events, processing data, creating report files, and exchanging information with other Windows programs. It also includes libraries for controlling popular GPIB instruments such as Keithley's DMMs, switches, SourceMeter® instruments, and sensitive line instrumentation. It operates in the Windows 95/98/NT/2000/Me/XP environments and has 32-bit capability. OCX and ActiveX® controls plug directly into TestPoint, providing a range of even more features from hundreds of third party vendors.

The TestPoint package is more powerful and flexible than ever, with a variety of new features:

- Test sequencer
- Objects to interface with Microsoft Word and Excel
- Bookmarks in the editor that permit you to quickly jump anywhere in the object list
- User interface upgrades
- New objects and functions, such as knobs, gages, an LED bar, odometer, slider, and more
- Timing and profiling tools
- MATLAB® interface makes it easy to take advantage of the power of MATLAB by sharing data, developing graphical representations, and using the extensive analytical capability resident in this widely used software package
- TestWizard and Test Styles for building professional customized applications quickly
- ActiveX 32-bit support to take advantage of the growing availability of hardware/software interfaces offered in this plug-in software format
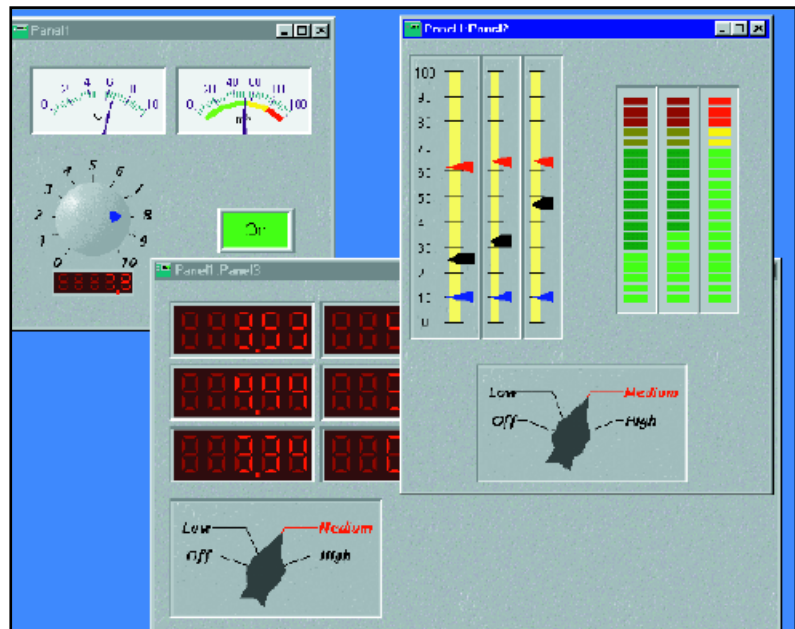


**Bitmaps, customized live buttons, and display text are easy to add for professional looking applications.**

**1.888.KEITHLEY** (U.S. only)

**www.keithley.com**

# KEITHLEY
A GREATER MEASURE OF CONFIDENCE

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### Free Run-Time Distribution

If you develop applications that will be used by others, you'll like TestPoint's simple run-time creation and free run-time distribution.

Once the TestPoint application is written, the designer can use it locally in the editing environment, create a run-time icon for use in Windows, or make a run-time disk. Run-time versions are as fast as compiled C/C++ programs. Run-time support is an integral part of TestPoint. Any TestPoint application can be packaged, written to floppy disk, and distributed free of charge for use on any Windows platform.

### Database Toolkit

TestPoint's Database Toolkit provides direct access to all popular database packages, including Access, MS SQL Server, Oracle, Sybase, IBM DB2 and SQL, Informix, Paradox, and other ODBC (open database connectivity) compliant databases.

TestPoint is fully compliant with the ODBC standard and provides complete SQL (structured query language) support. This means that any function that is supported by your database can be used by TestPoint. For example:

- Manipulate records—create, select, insert, update, and delete records.

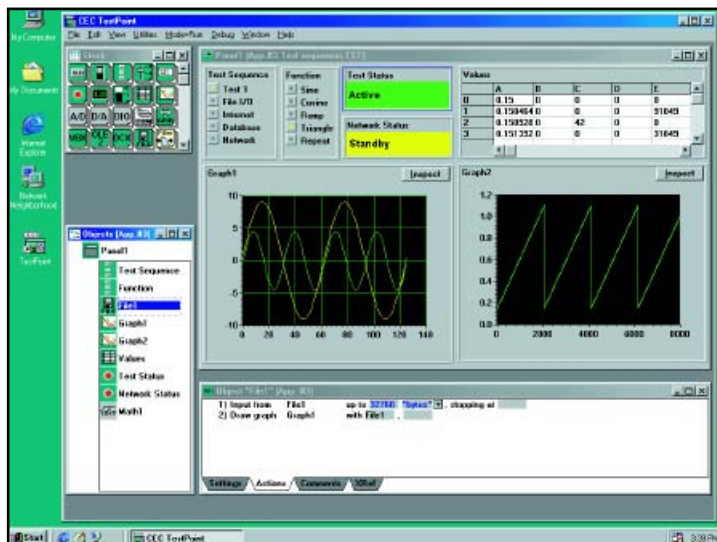- Search a database and retrieve all records that match the specific conditions.

The Database Toolkit supports remote access between PCs, PCs and a server, and PCs and a mainframe. It also provides full development and runtime support.

Like all TestPoint offerings, the Database Toolkit uses the drag-and-drop interface for ease of use.

### Internet Toolkit

TestPoint's Internet Toolkit provides a web server, a TCP/IP (Internet) object, and an e-mail object that allow you to:

- Monitor and control instruments, A/D, D/A, digital I/O, and custom hardware through your Internet browser (Netscape Navigator, Internet Explorer, etc.) from anywhere in the world;
- See and capture graphs, pictures, audio, and video;
- View all or part of any remote application;
- Insert test data, images, and graphs into web pages; and
- Communicate with any TCP/IP-based program or instrument on any network-connected computer.

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### APPLICATIONS

- **General data acquisition and analysis applications**
- **Control USB, PCI, ISA, or PCMCIA data acquisition boards and modules**
- **Automatic test equipment systems**
- **GPIB, RS-232/485, and VISA instrument control**
- **PID control**
- **Thermocouple measurements**
- **Time- and frequency-domain analysis**
- **Waveform generation**
- **Industry test and research applications**

The Internet Toolkit's advanced "server push" technology allows you to automate. For example, you can have updates or downloads happen automatically at specific times or whenever certain operating conditions occur. The following lists a few examples of what you can do with the e-mail feature of TestPoint combined with the "server push" technology.

- At timed intervals, send test results to an e-mail distribution list.
- Send maintenance notices based on cycle time, wear, or other measurement.
- Send alarm messages when abnormal measurement conditions occur.

### TestPoint Statistical Process Control (SPC) Toolkit

The TestPoint SPC Toolkit adds charts, statistics, and analysis capabilities to test and measurement applications. The SPC Toolkit provides a variety of charts and calculations, including: Xbar, R, X, mR, mXbar, R, and Pareto charts, histograms, process capability (Cp, Cpk), standard deviation, skew, kurtosis, and many other commonly used statistical functions and graphs.

Typical applications for the TestPoint SPC Toolkit include:

- Production line quality monitoring
- Process improvement
- Process analysis
- Real-time process control
- Production cost analysis

### TestPoint Math Object Support

**ANALYSIS FUNCTIONS:** Integration, differentiation, FFT() and IFFT(), frequency, magnitude and phase.

Hamming, Hanning, Blackman, Blackman-Harris3, Blackman-Harris4, histogram, convolve, solve, sort.

Linear least squares, Polynomial regression.

**BASIC FUNCTIONS:** +, -, *, /, exponentiation mod, not, and, or, xor, sqr(), sgn, factorial, <, <=, =, =>, <>, comparison operators for numbers or vectors, floor, ceil, round, int, abs, sgn, rnd, rndNormal.

**CONTROL FUNCTIONS:** Proportional, PID, PD, PI, ID, and user defined functions.

**CONVERSION FUNCTIONS:** hex(), valhex(), binary(), valbin(), str(), Convert to Number/ String/ Vector or List.

**CURVE FIT FUNCTIONS:** Linear, exponential, polynomial, logarithmic, interpolation.

**DIGITAL FILTERING:** Butterworth, Chebyshev, and Bessel. All math functions can be combined and nested to any level. Math functions accept multiple data types (polymorphic) and are computed to 15 significant digits.

**FILTER FUNCTIONS:** lowpass, highpass, bandpass, notch, FIRFilter, IIRFilter, smoothavg/avgcentered/median.

**LIST FUNCTIONS:** list, sublist, select.

**MISCELLANEOUS FUNCTIONS:** cliplower, clipupper, cliprange, if, type, pi, e, length, previous, interpolation, random number generator (8 methods), counter. Numbers can be formatted in engr. or scientific notation.

**STATISTICS FUNCTIONS:** avg(), sum(), mean(), median(), mode(), stddev(), min(), minindex(), max(), maxindex().

**STRING FUNCTIONS:** asc, substr(), instr(), chr(), string concatenation, strtrim, strcomp upcase(str), lowcase(str).

**TRIG AND LOG FUNCTIONS:** sin, cos, tan, asin, acos, atan2, atan, sinh, cosh, tanh, sqr, log10, log, exp, pow2, pow10, factorial.

**VECTOR/ARRAY FUNCTIONS:** zero(), one(), ramp(), idn(), dim(), vector replacement, index, subarray, reverse, rotate, determinant, inverse, transpose, decimate, matMultiply, appendVector, generateSin/Cos/Triangle/Ramp generate/Square/ Steps generateRepeat.

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## TestPoint Specifications

**OBJECTS:** TestPoint includes 55 standard objects that perform the functions listed below. Any number of objects can be used in any order, individually or combined with other objects to create user defined objects. In addition to the functions listed, objects for instruments, closed loop control (PID), thermocouple measurements and engr. unit conversions are also included. TestPoint objects have settings which control their physical and operational characteristics. The object settings position and size are programmable. The properties of ActiveXobjects added to TestPoint are programmable. All math functions can be nested and, where applicable, all math functions operate on scalars, vectors, and arrays.

## OBJECT FUNCTIONS

**ACQUISITION AND TRANSFER RATES:** Acquisition speeds and data rates are determined by the hardware rates of the installed interface cards and computer/disk throughput. TestPoint does not limit the maximum data acquisition rate of A/D or output of D/A cards. IEEE-488 max. data rate using Keithley IEEE-488 cards is 1.5Mbytes per second, continuous.

**A/D FUNCTIONS:** Acquire n samples, start A/D and signal event after n samples, single sample, pretrigger, trigger immediate, digital, analog, channel, level, polarity (+/-), mode (edge, level), gain, hysteresis, A/D burst mode (on, off) 1 to 2E+09 or continuous samples per channel. Supports multiple boards, unlimited channels, thermocouples, strain gauges, and manufacturer specific commands.

**CODE OBJECT:** Supports all external code DLLs and Windows API functions and parameter passing.

**CONDITIONALS:** if/then, if/then/else, case on all math and logical operations. Unlimited nesting.

**DATA FORMATTING:** Numeric, string, array, vector or list, 488.2, high/low byte first, arrays of numbers or strings, any delimiter(s) and any sequence.

**DEBUG MODE:** Single step, multistep, breakpoints, data view, enable/disable action lines.

**DEMO MODE:** All objects that access hardware or instruments will run with simulated data if the hardware or instrument is not present.

**DIGITAL I/O:** Output, input, set bits, configure, multiple board support, comprehensive examples included.

**D/A FUNCTIONS:** Start rate, channels, value, mode (continuous or once) arbitrary function generator, and editing from equation, data entry, or file. Supports multiple simultaneous D/A output.

**EDITING:** cut, copy, paste, paste/cancel link, Windows tabs, Z-ordering, object alignment, snap to grid.

**ERROR HANDLER:** any group of errors can be assigned to an error object.

**FILES:** Open, close, input, output, erase, set/get filename, filters, warnings, check existence, initial value, network access, and other features.

**FULL CLIENT/SERVER DYNAMIC DATA EXCHANGE (DDE):** Copy, paste, paste/cancel link for use with Lotus, Microsoft, Borland, and other products.

**GENERAL PURPOSE I/O:** Memory or I/O mapped, word or byte, bit test.

**GRAPHICS:** Draw, clear, and add points to line, strip, or bar charts. Linear, semilog, or log scaling, X vs. Y, autoscaling X and/or Y, multiple Y axes, settable axis intercept, major/minor grids and tics. Choice of background, grid, and waveform colors, indicators, and annotation. Inspect, zoom, pan, and tabular data.

**GROUPING:** Any number of objects can be grouped and groups can be grouped to achieve hierarchy.

**GUI CONTROLS:** Pushbutton, switch, selector, slider, text, data-entry, indicator, display, bar, grid, graph, knob, gauge, LED display, user-defined switch/selector. ActiveX controls and OLE automation, test sequence, step, and prompt (message) objects, Microsoft Word and Excel interface objects.

**HELP:** Complete context sensitive help with search, examples, copy, paste, and print capabilities.

**IEEE-488:** All IEEE-488 (HP-IB, GP-IB) functions, commands, and instruments are supported. Hundreds of instrument libraries included with an automated test and custom library tutorial. Supports Keithley KPCI-488 and KUSB-488.

**LOOPS:** Linear, geometric, decade, do while, repeat until. Unlimited nesting.

**MATHEMATICS AND ANALYSIS FUNCTIONS:** See the TestPoint Math Object Support section

**MAXIMUMS:** The number of objects, panels, and applications is limited only by memory. Maximum numeric vector dimension > 2E+6.

**MULTITASKING/MULTITHREADING**

**OLE2:** Embedded data, one way and two way links. Timer provides access to current time and date with 50msec resolution.

**PANELS:** Settable size, position, and background color

**PICTURE:** BMP, GIF, JPG, TIF, PCX, TGA, EPS, WMF, PCT import/ display to 16.7M Colors, options for bezel, tile, stretch, etc.

**REPORT GENERATION:** Programmable fonts, size, tabs, margins, headers, page numbers, time, date, text positioning, pagination, etc.

**RS-232:** Up to 9 ports. Timeout, I/O delimiter, queue size, event signaling, mode, baud rate, DTR, RTS, break, handshake mode.

**RUNTIME:** Complete runtime packaging utility for test applications and related DLLs, INIs, pictures, and executables. Runtimes support multitasking and any number of runtimes can execute simultaneously.

**USER DEFINED OBJECTS:** Any set of objects , including code objects and other user defined objects can be packaged as a user defined object. Objects can have hierarchy and be locked (password protected) or unlocked for distribution.

**VISA:** Supports any VXI or GPIB-VXI controllers and all VXI instruments, as well as GPIB boards from multiple vendors.

## SUPPORTED KEITHLEY DATA ACQUISITION HARDWARE

KUSB-31xx Series, KPCI-31XX Series, KPCI-1801HC/1802HC, KPCI-PIO, -PDISO Series, KPCMCIA Series, DAS-800/801/802 (up to four boards in interrupt mode), DAS-1200/1400/1600 (up to two boards from the entire DAS-1600 family in interrupt or DMA mode), DAS-1800 Series (up to three boards in interrupt or DMA mode for the entire series). Other boards may be supported — consult factory for the latest list.