

Low-cost, Compact USB Data Acquisition Starter Kit

Four ± 10 V Differential Analog Inputs protected to ± 150 V

10-bit Resolution

Up to 240 Hz Sample Rate

2 Dedicated Digital Inputs

Provided with WINDAQ Software



The DI-145 is a new product in a long line of low-cost starter kits from DATAQ Instruments. Suitable for measuring preamplified analog signals, the DI-145 in tandem with the included WINDAQ software allows real time data acquisition, playback, and analysis performance equal to or better than other products that cost ten times or more than its low price. Predecessors of this instrument have been sold to over 20,000 hobbyists and professionals for countless data acquisition applications around the world. The DI-145 continues this legacy with an improved interface, and noise-cancelling differential analog inputs that are transient-protected to ± 150 VDC or peak AC. This is our toughest and most tolerant starter kit ever.

The DI-145 offers four analog input and two discrete (digital) input channels. The analog inputs offer a fixed measurement range of ± 10 VFS, and are multiplexed to an integrated 10-bit ADC. Both analog and digital inputs are protected to ± 150 and ± 30 VDC or peak AC respectively. Sample rates as slow as 2.23 per min. and as fast as 240 per sec. (divided by the number of enabled channels) are supported. Included WINDAQ software allows a real time display of any combination of analog channels, and the ability to stream acquired data to disk in recorder-like fashion. The DI-145's two digital inputs are dedicated for remote stop/start and remote event operations using WINDAQ software. WINDAQ also includes software to review recorded data files, including waveform analysis and data file export to Microsoft Excel and other applications.

Features

Four Analog Input Channels

Connect the DI-145 to any preamplified signal in the typical range of ± 5 to ± 10 VFS.

10-bit ADC resolution

Provides 19.5 mV resolution across the entire DI-145 measurement range.

Ruggedized Inputs

All four DI-145 analog inputs and both discrete inputs are over-voltage protected. Accidents that happen are quickly forgiven.

Noise-cancelling Analog Input Configuration

The noise-immunity of differential inputs minimizes the affects of common mode noise so often encountered in industrial measurements.

Built-in USB interface

The DI-145 is provided with a built-in USB interface, allowing it to be connected and run with any laptop or desktop PC. The USB interface provides power to the DI-145, eliminating clumsy external power supplies.

Backward-compatible with DI-194RS Protocol

OEM software that was written to support the DI-194RS protocol will work with the DI-145 in its special DI-194RS emulation mode.

Wide OS support

Signed drivers are provided with the DI-145 that allow trouble-free installation for Windows XP and both 32- and 64-bit versions of Windows Vista, Windows 7, and Windows 8. For the latest OS support, check online at <http://www.dataq.com/products/windaq/windows-compatibility/>.

Included WINDAQ software

Our WinDaq data acquisition software offers real time display and disk streaming for the Windows environment. The real time display can operate in a smooth scroll or triggered sweep mode of operation, and can be scaled into any unit of measure. Event markers with comments allow you to annotate your data acquisition session with descriptive information as you're recording to disk. Raise your productivity to new heights with WinDaq's unique multitasking feature. Record waveform data to disk in the background while running any combination of programs in the foreground — even WinDaq Playback software to review and analyze the waveform data as it's being stored! Playback supports waveform analysis (Statistics, X-Y plots, frequency analysis) and the ability to export data to Microsoft Excel. WinDaq recording and playback software is provided free with every DI-145 purchase. View the Multimedia Tutorial for more information. Download software for the DI-145 at run.dataq.com.

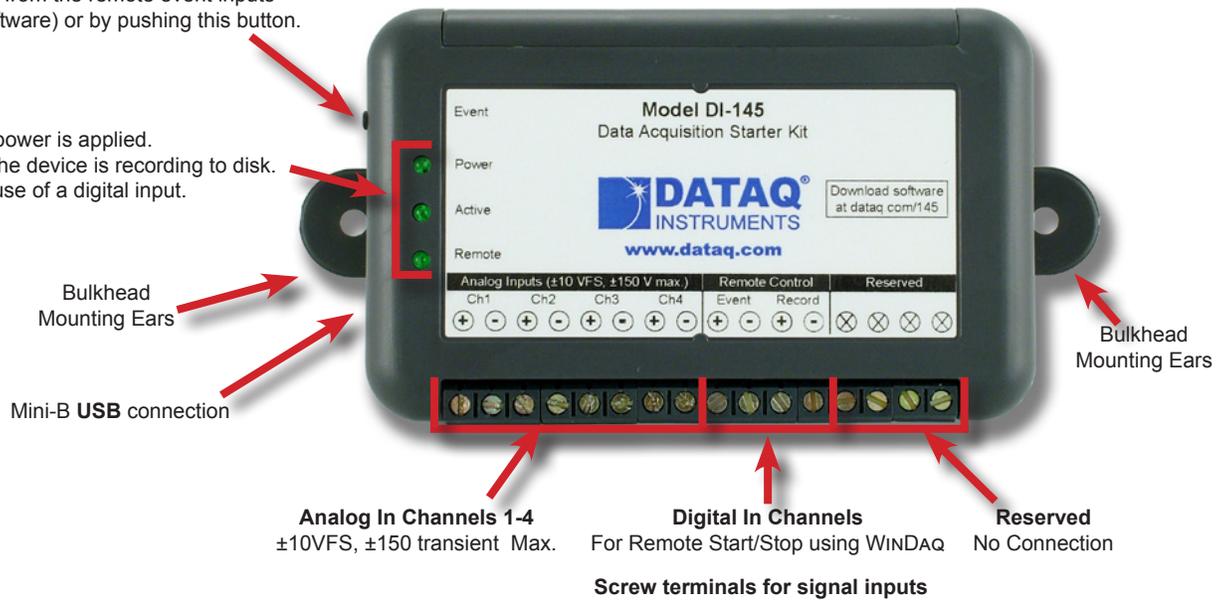
DI-145 Close-up

Remote Event push-button

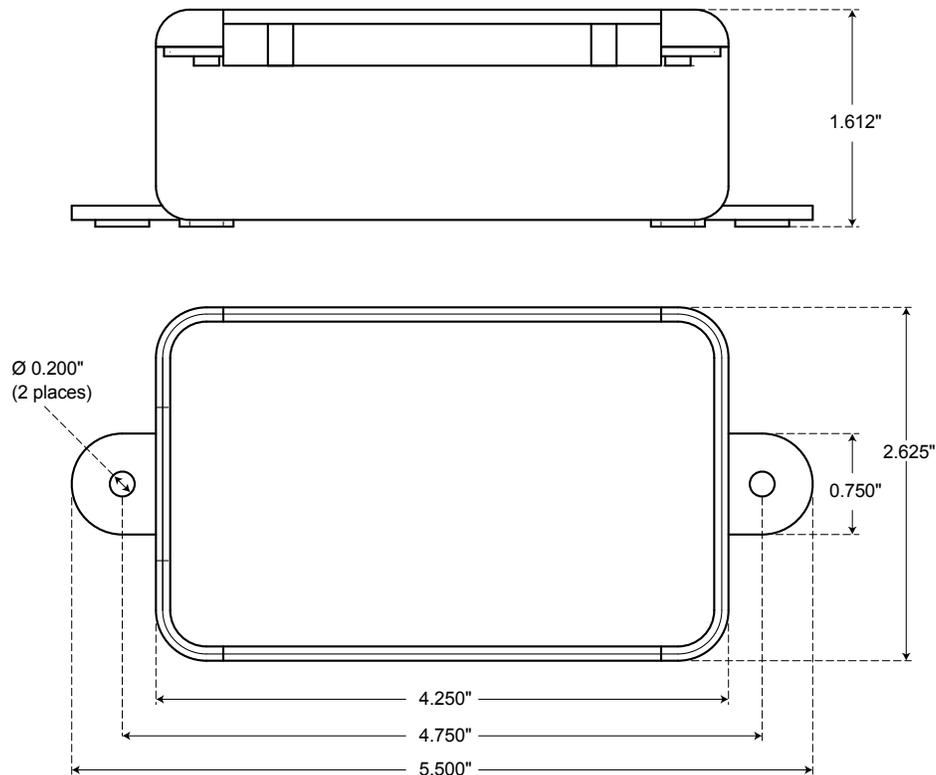
Trigger events either from the remote event inputs (through WinDaq software) or by pushing this button.

LED Indication

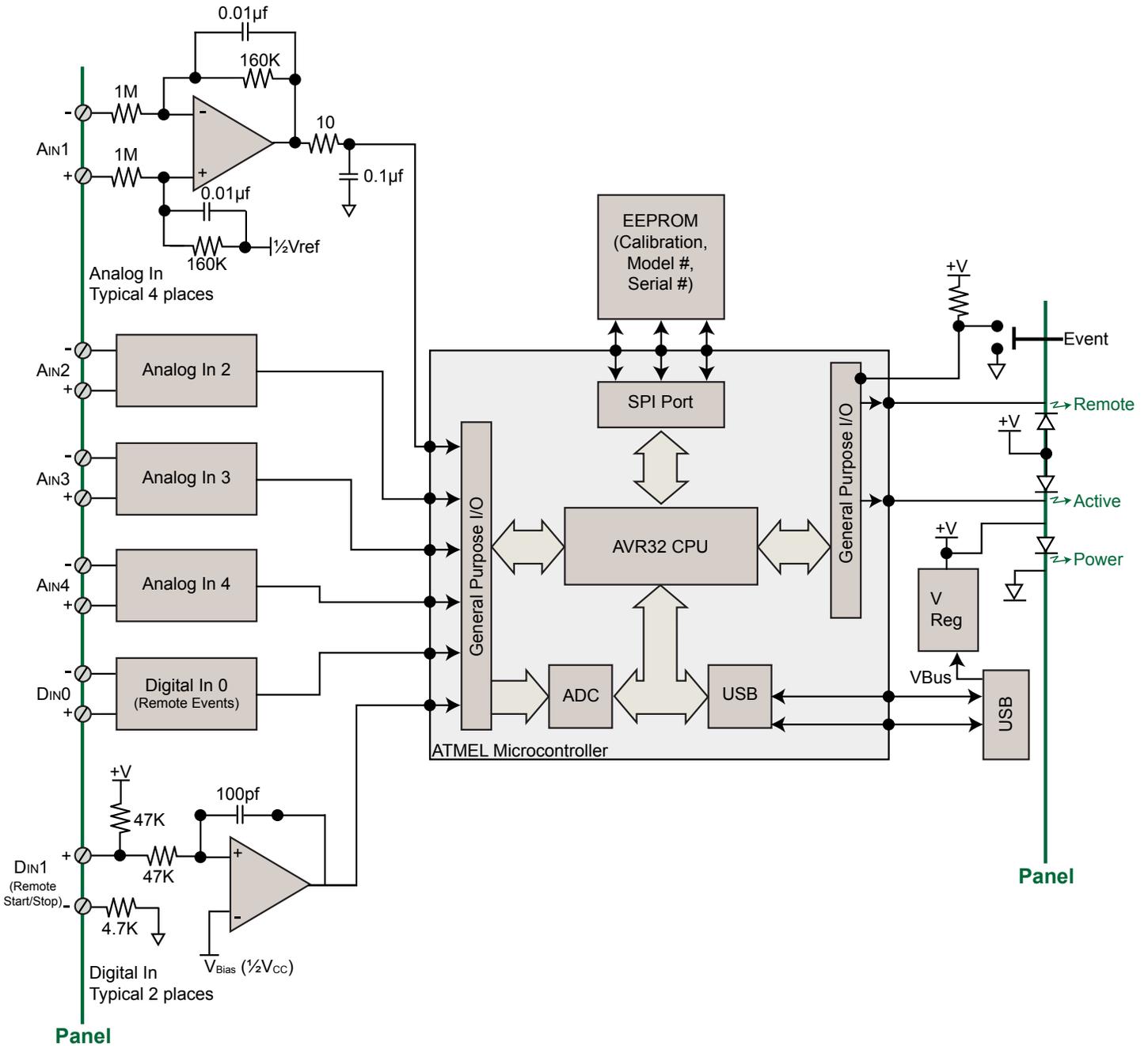
Power LED indicates power is applied.
Active LED indicates the device is recording to disk.
Digital LED indicates use of a digital input.



Dimensional Drawing

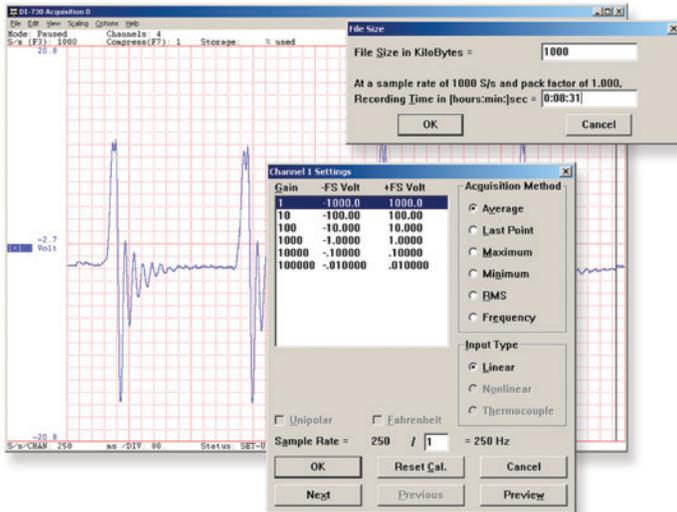


DI-145 Block Diagram



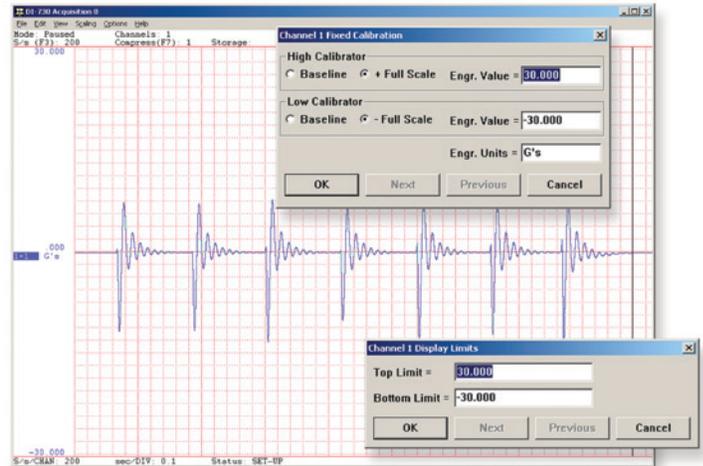
Setup

Double-click and enter the channels you want to acquire into the WINDAQ scan list. Click to select signal averaging, true RMS, frequency, and peak or valley detection per channel. Click to define a single to 4-channel display — either triggered sweep (oscilloscope-like) or scrolling (chart recorder-like). Click again to define a sample rate ranging from less than 2.23 samples per minute to 240 samples per second.



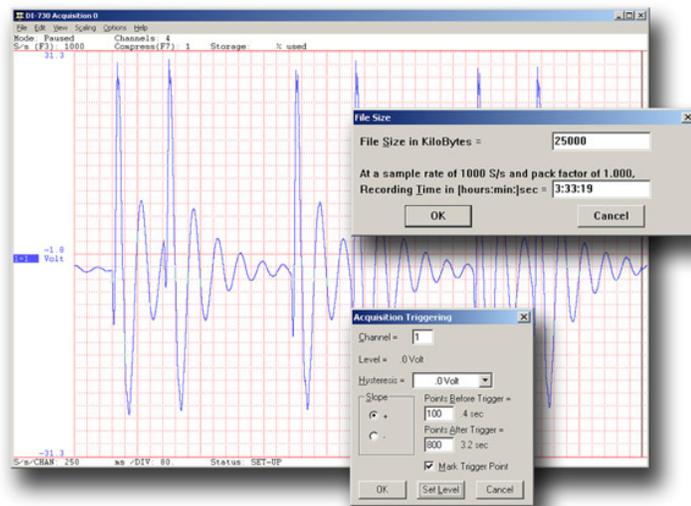
Calibrate

Define calibration per channel to display waveform values in meaningful units such as psi, °F or °C, amps, rpm, watts, horsepower — any unit of measure you need.



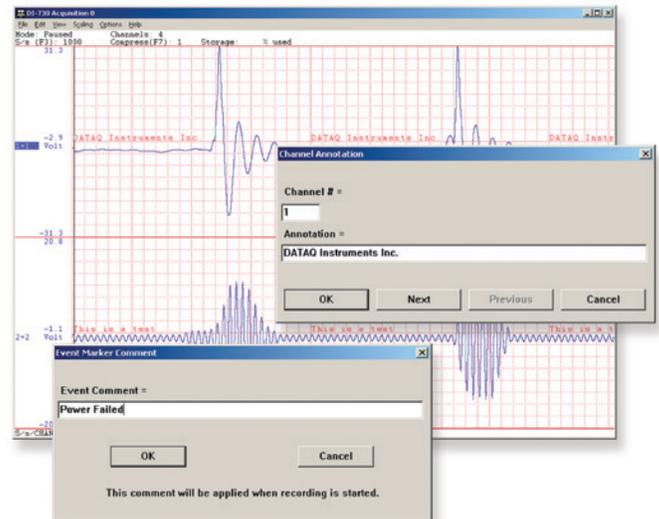
Record

Choose a continuous waveform recording mode or the triggered mode with selectable trigger level, slope, and post-trigger times. WINDAQ automatically time- and date-stamps, then streams acquired data to disk — record as much data as you need. At the same time, WINDAQ supplies a real-time graphical display of any or all channels so you always know where you are and where you're going.



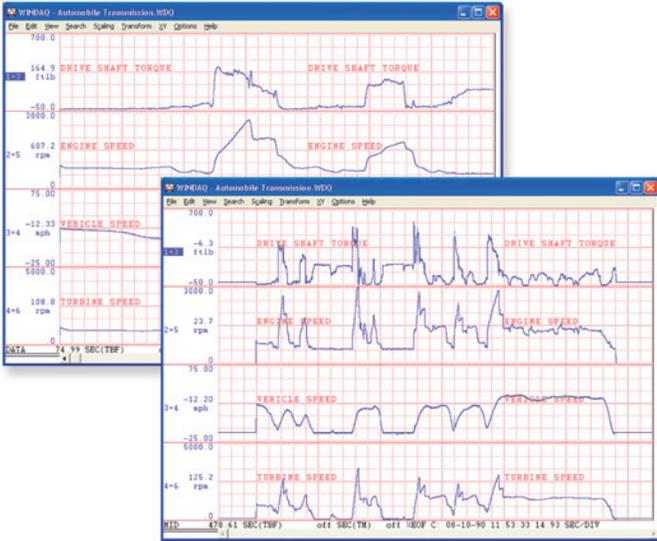
Annotate

Of course, you can label any channel with text that describes it — “Motor 1,” “Engine speed,” “Vertical position,” etc. But WINDAQ also allows you to supply commented event markers while you record — “Beginning test phase 1,” “Small vibrations noticed,” “Starting cool-down cycle,” etc. Your comments and our acquired data combine to form a complete diary of your data acquisition session.



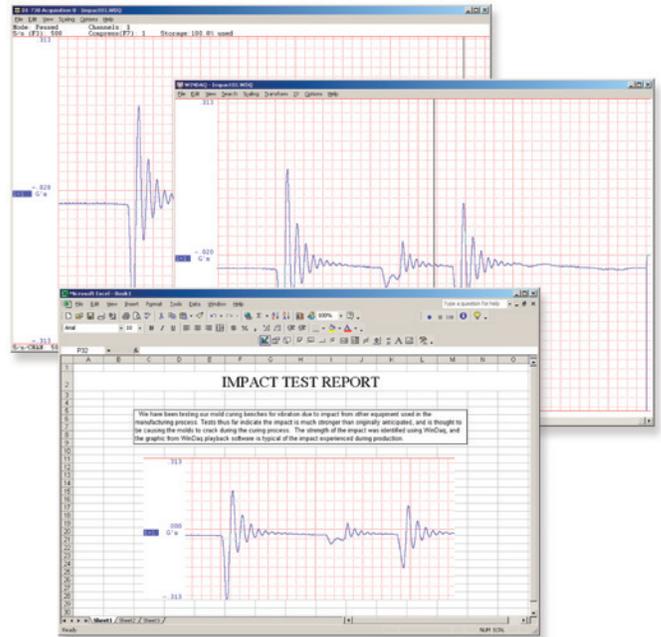
Playback

Recording is only half the solution. WINDAQ's Waveform Browser playback software allows you to graphically manipulate waveforms in ways you've never seen on a PC. Compress an entire recording to one screen-width for a bird's eye view, then expand around an area of interest for a closer look. Use the cursor to measure amplitudes and timing with precision. Move to any event marker with the click of a mouse button.



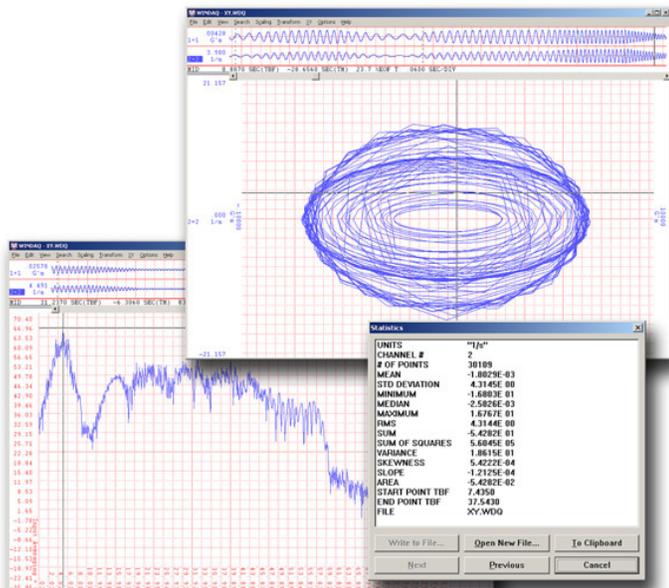
Multitask

Double your productivity and let WINDAQ record while you review last week's results from your spreadsheet, or compose a memo with your word processor. You can even play back data already stored to disk while you're still recording.



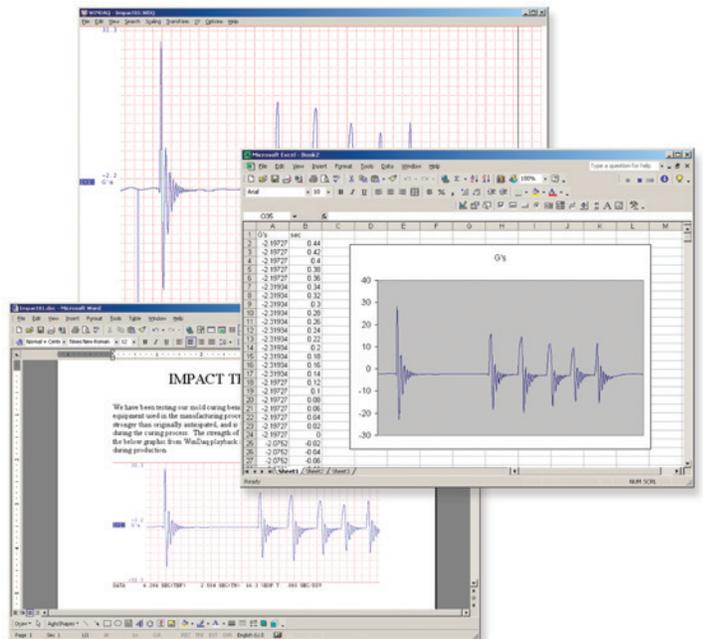
Analyze

Waveform interpretation is easy with our built-in analysis functions. Apply frequency and filtering analysis with the WINDAQ Waveform Browser FFT and DFT functions. Analyze any range of waveform data with the statistics function. Use X-Y plotting to examine the relationship of one channel to another. Optional Advanced CODAS analysis functions allow waveform peak detection, integration, differentiation, arithmetic operations, and more.



Export

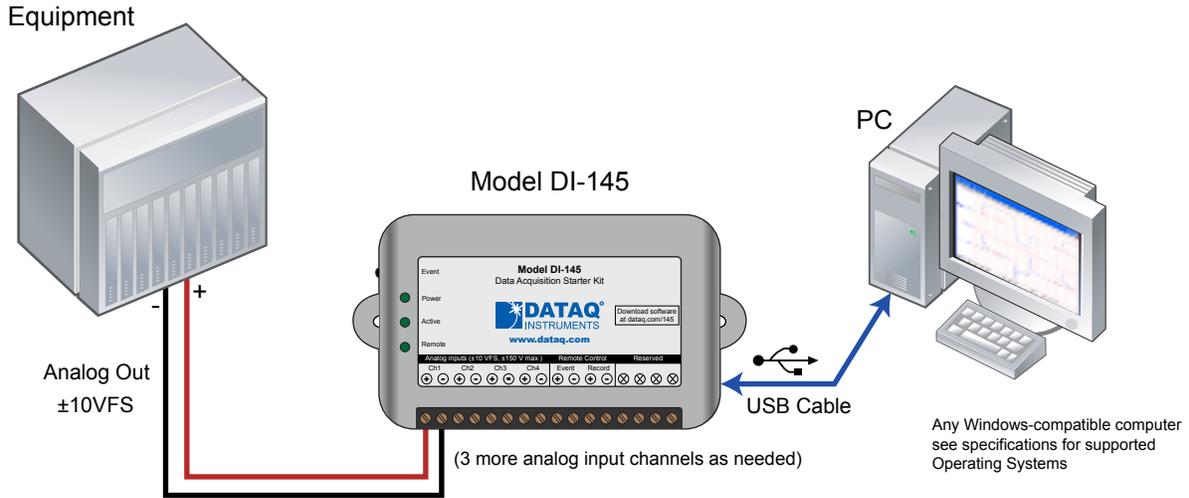
The WINDAQ Waveform Browser can export any range of data to your spreadsheet, or any other analysis or presentation package you use. You can even copy a graphical image displayed by the WINDAQ Waveform Browser and paste it directly into a word processing document. Finally, export any range of waveform graphics to your printer for a hard copy record.



Typical DI-145 Applications

Replace Traditional Chart Recorders

Digitize and record measurements from instruments with high-level analog outputs.

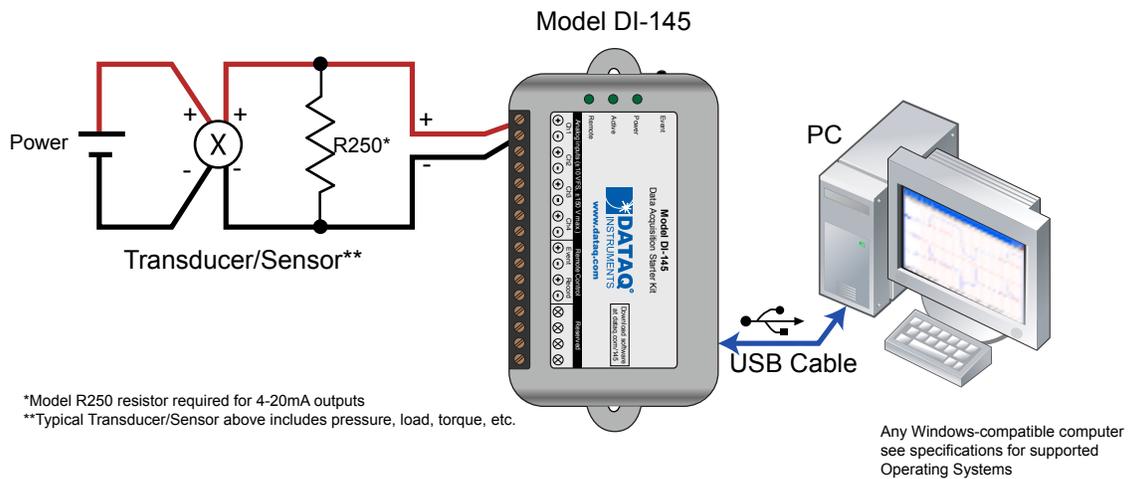


Examples of “Equipment” above include gas chromatographs, liquid chromatographs, spectrometers, bio-amplifiers*, etc.

* DATAQ Instruments’ hardware and software products are NOT designed to be used in the diagnosis and treatment of humans, nor are they to be used as critical components in any life-support systems whose failure to perform can reasonably be expected to cause significant injury to humans.

Amplified Transducer Monitor

Connect directly to and record the output of amplified voltage- or current-mode transducers.

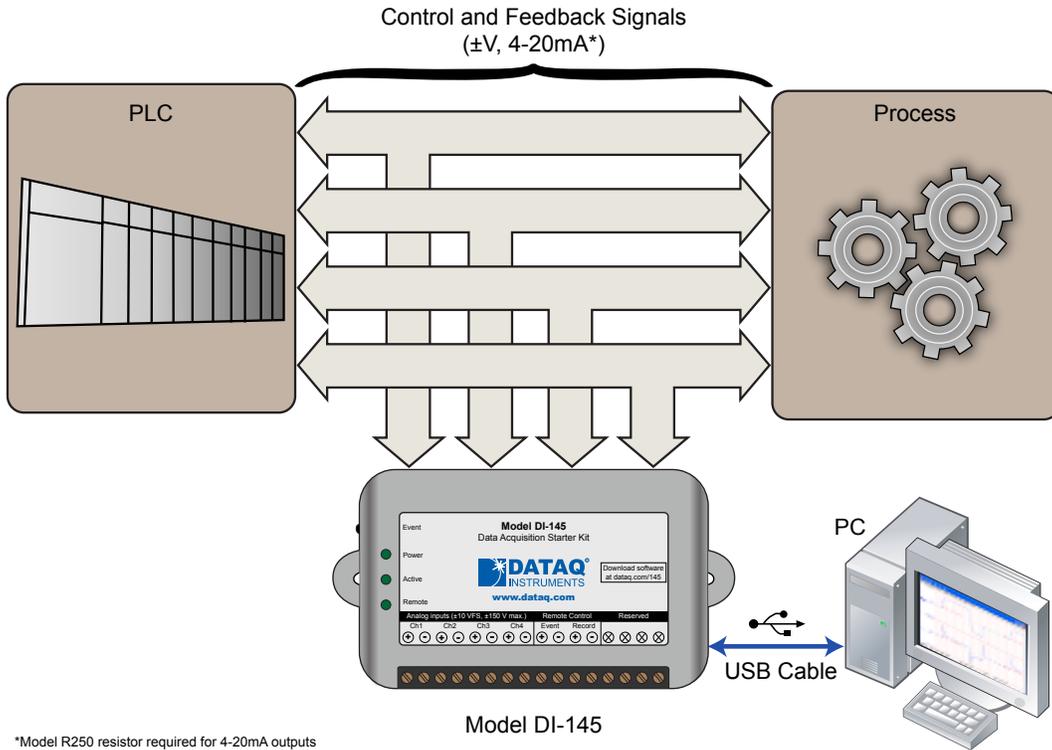


Typical Transducer/Sensors above include pressure, load, torque, Etc.

Typical DI-145 Applications (continued)

Process Monitoring

Trend plot and record control and feedback signals to troubleshoot process glitches.

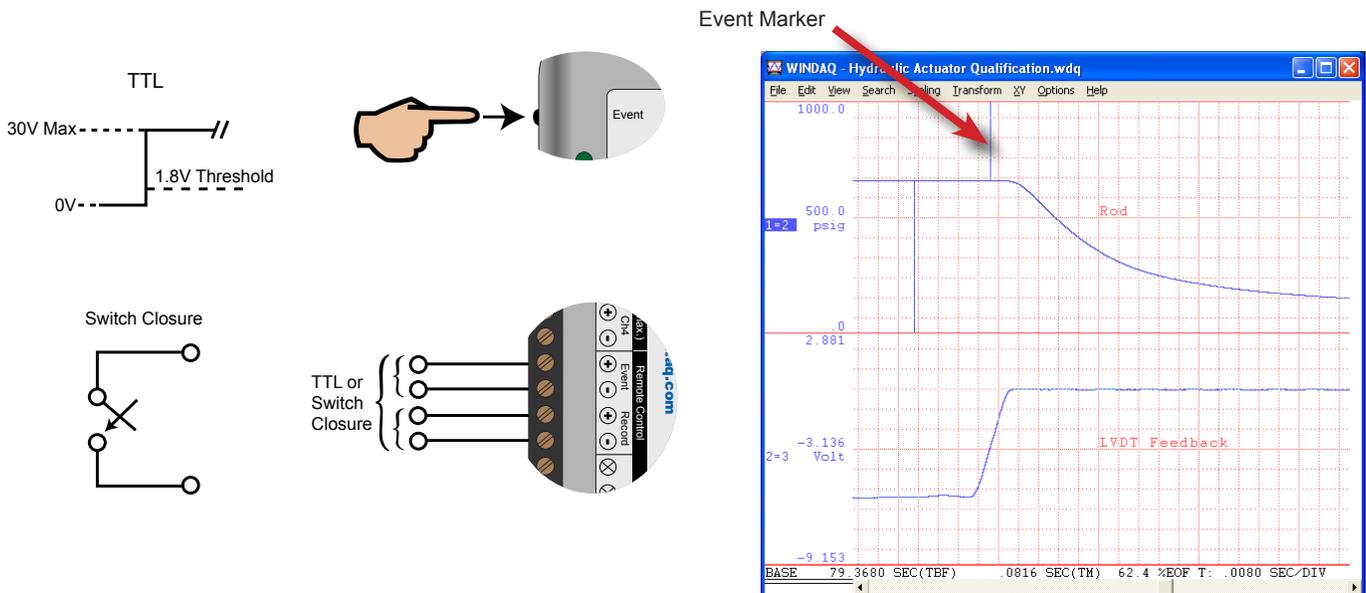


*Model R250 resistor required for 4-20mA outputs

Any Windows-compatible computer
see specifications for supported
Operating Systems

Remote Control Close Up

The DI-145 supports several methods to increase measurement flexibility and data record interpretation. The remote record feature allows you to synchronize WinDaq recordings to external processes by remotely enabling and disabling WinDaq's stream-to-disk feature. Remote events allow you to insert an event marker in the data stream (see inset) to identify when an event occurred relative to recorded waveform activity. Events can be activated by the pushbutton on the DI-145 enclosure, though a keyboard keystroke (which also allows you to record a description), or remotely via the remote event input. The stream-to-disk function can also be controlled through the keyboard, or through the remote record input. Valid remote record and event signals are switch closures, or discrete levels with a maximum input of 30 V and a threshold of 1.8 V.



DI-145 Specifications

Signal Inputs

Analog Inputs

Number of Channels: 4
 Configuration: Differential
 Full Scale Range: $\pm 10\text{VFS}$
 Input impedance: $1\text{ M}\Omega$, each input to ground
 Isolation: none
 Accuracy: $\pm 0.25\%$ of FSR
 Overall inaccuracy: $\pm 64\text{mV}$ (at 25°C)
 DC common mode rejection: 40db (at 25°C)
 Max input without damage: $\pm 75\text{ V}$ peak, continuous
 $\pm 150\text{ V}$ peak, one minute or less
 Max common mode voltage: $\pm 10\text{V}$
 Analog frequency response: $-3\text{db @ } 100\text{ Hz}$

Digital Inputs

Number of Channels: 2
 Pull-up value: $47\text{ K}\Omega$ from + input to 3.3V
 Pull-down value: $4.7\text{ K}\Omega$ from - input to USB ground
 Input high voltage threshold: 1.8 V minimum
 Input low voltage threshold: 1.4 V maximum
 Operating range: $0 - 30\text{ V}$
 Absolute maximum values: $\pm 30\text{ VDC}$

ADC Characteristics

Resolution: Overall: 1 part in 1,024 (10-bit)
 Above zero: 1 part in 511
 Below zero: 1 part in 512
 1 ADC Count = $\pm 19.5\text{ mV}$
 Max sample throughput rate: 240 Hz
 Min sample throughput rate: $0.44\text{ samples per minute}$
 Sample rate timing accuracy: 50 ppm

Reserved Inputs (Digital Inputs)

Digital In 0: WINDAQ remote start/stop
 Digital In 1: WINDAQ remote events

Indicators and Connections

Interface: USB 2.0 (mini-B style connector)
 Indicators (LED): Power, Active, Digital
 Input Connections: One 16-position terminal strip

Power

Power Consumption: 0.30 watts , via USB interface

Environmental

Operating Temperature: 0°C to 55°C (32°F to 131°F)
 Operating Humidity: 0 to 90% non-condensing
 Storage Temperature: -20°C to 45°C (-4°F to 113°F)
 Storage Humidity: 0 to 90% non-condensing

Physical Characteristics

Enclosure: Hardened Plastic
 Mounting: Desktop; bulkhead
 Dimensions: $2.625\text{D} \times 5.5\text{W} \times 1.53\text{H}$ in.
 $(6.67\text{D} \times 13.97\text{W} \times 3.89\text{H}$ cm.)
 Weight: 3.6 oz.

Software Support

WINDAQ software: OS support: View Online (<http://www.dataq.com/products/windaq/windows-compatibility/>)
 Sample Rate Limit: 240 Hz
 Backwards compatibility: DI-194RS compatibility mode supports Linux and MatLab
 Programming: [DATAQ Instruments SDK](#)

Ordering Guide

Description	Order No.
DI-145 Data Acquisition Starter Kit Data acquisition device with USB cable, screwdriver, and free WINDAQ software via Internet download (run.dataq.com).	DI-145
R250 Optional precision 250-ohm 4-20 mA shunt resistor (see non-isolated implementation here).	R250



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Data Acquisition Product Links

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