DaqTemp™ Series

High-Accuracy PCI Thermocouple/Multifunction Data Acquisition System

NEW

Features

- **Measure thermocouples, volts, frequency, pulses, digital inputs, and generate analog outputs, digital outputs, and timer outputs—all in one box!**
- **Includes a PCI plug-and-play card, screw-terminal/signal conditioning pod, cable and extensive software support**
- **7 or 14 thermocouple input channels**
- **Supports TC types J, K, S, T, B, E, N, R**
- **TC resolution of 0.1˚C, accuracy better than 1˚C**
- **200K readings/s measurement rate**
- **7 differential voltage input channels, with 13 programmable ranges from ±156 mV to ±10V input**
- **24 digital I/O lines**
- **4 frequency/pulse counting input channels**
- **2- or 4-channel 16-bit/100-kHz, waveform-capable analog outputs**
- **2 timer output channels**
- **100% digital calibration**
- **DaqView™ Out-of-the-Box™ software for effortless set up, acquisition, and real-time data viewing**
- **Includes support for Visual Basic®, C/C++, ActiveX/COM, LabVIEW®, and DASYLab®**

The DaqTemp™ series of data acquisition products provides a total hardware/software/signal conditioning solution for high-accuracy temperature, voltage, frequency, and pulse counting measurements, plus digital I/O and analog output. DaqTemp contains a full suite of software including DaqView™ Out-of-the-Box™ software, plus support for Visual Basic, C/C++, ActiveX/COM, LabVIEW, and DASYLab.

DaqTemp hardware is comprised of a plug-and-play PCI board, 3 ft. cable, and screw terminal/signal conditioning pod. Cold-junction compensation is built-in to the DaqTemp, which provides precise thermocouple measurements, with channel-to-channel variation and noise less than 0.2˚C, and accuracy better than 1.0˚C. A separate low-noise amplifier per TC channel allows for these exact measurements. DaqTemp is available with either 7 or 14 thermocouple input channels. All power for the DaqTemp is derived from the PC; therefore no external power supplies or transformers are needed.

See Personal Daq for USB-based TC/multifunction measurements

DaqTemp includes a full suite of software including DaqView Out-of-the-Box™ software

DaqTemp Series Configurations*						
Model	**TC Inputs**	**Voltage Inputs**	**Frequency Inputs**	**Pulse Outputs**	**Analog Outputs**	**Digital I/O**
DaqTemp/7	7	7	4	2	0	24
DaqTemp/7A	7	7	4	2	2	24
DaqTemp/14	14	7	4	2	0	24
DaqTemp/14A	14	7	4	2	4	24

* Includes 3 ft. cable, PCI plug-in board, DaqView™ software, and drivers for DASYLab®, LabVIEW®, and Windows®-based languages including Visual Basic® and C++

In addition to thermocouple inputs, DaqTemp also provides 7 differential voltage input channels that offer 16-bit resolution and 13 programmable full-scale input ranges from ±156 mV to ±10V. The 4 frequency input channels can measure frequency or count pulses up to 10 MHz. Two timer output channels are capable of generating square wave outputs up to 1 MHz. Twenty-four digital I/O lines are also included, which can be programmed in 8-bit groups as either inputs or outputs.

All inputs, including thermocouple inputs, voltage, frequency, and digital, can be synchronously scanned up to 200K readings/s, which provides accurate time correlation between all inputs. The 16-bit/100-kHz

analog outputs can be used to generate waveforms with a virtually infinite waveform output length from PC memory.

All inputs and outputs are accessed via convenient screw terminals located on the signal conditioning pod. The cover of the signal conditioning pod is easily removed to gain access to the screw terminals for signal connections.

Software

The DaqTemp is supplied with DaqView™ Out-of-the-Box™ software, which enables you to set up your acquisition, view the results in real time, and save the data to disk—all without any programming. DaqView's intuitive graphical user interface is as easy to

use as a spreadsheet, yet powerful enough for most data acquisition applications. DaqView performs all thermocouple linearization and conversion of readings to engineering units. You can trigger an acquisition on temperature level, digital input, voltage level, frequency input, software command, and more. Real-time graphical output can be any combination of digital readouts, scrolling strip-charts, bar graphs, or dials. Every channel can be displayed in any or all of the available real-time display indicators.

TC Accuracy at Measurement Temperature in °C (±°C)											
Type	Min	Max	-100	0	100	300	500	700	900	1100	1400
J	-200	760	0.6	0.5	0.5	0.6	0.7	0.7	—	—	—
K	-200	1200	0.7	0.6	0.6	0.7	0.8	0.8	0.9	1.0	—
T	-200	400	0.7	0.6	0.6	0.6	—	—	—	—	—
E	-270	650	0.6	0.5	0.5	0.5	0.6	—	—	—	—
S	-50	1768	—	2.3	1.8	1.5	1.5	1.4	1.5	1.6	1.6
R	-50	1768	—	2.3	1.6	1.5	1.4	1.4	1.3	1.4	1.5
B	50	1780	—	—	—	3.7	2.4	2.1	1.8	1.7	1.5
N28	-270	400	0.9	0.7	0.7	0.7	—	—	—	—	—
N14	0	1300	—	0.7	0.7	0.7	0.8	0.8	0.9	1.0	—

Specifications

General
Power Consumption: 5.5W
Operating Temperature: 0° to +60°C
Relative Humidity: 0 to 95%, non-condensing
PCI Board Dimensions:
   165 mm W x 15 mm D x 108 mm H
   (6.5" x 0.6" x 4.2")
Signal Conditioning/Screw Terminal Pod Dimensions:
   86 mm W x 240 mm D x 42 mm H
   (3.4" x 9.44" x 1.65")

A/D Specifications
Type: Successive approximation
Resolution: 16 bit
Conversion Time: 5 µs
Maximum Sample Rate: 200 kHz
Nonlinearity (Integral): ±1 LSB
Nonlinearity (Differential): No missing codes

Voltage Inputs
Channels: 7 differential inputs, programmable on a per-channel basis for unipolar or bipolar
Temperature Coefficient: ±(10 ppm +0.3 LSB)/°C
Input Impedance: 20M Ohm (differential)
Bias Current: <1 nA (0° to 35°C)
Common Mode Rejection: 86 dB, DC to 60 Hz for gains < =8; >100 dB for gains > =16
Maximum Input Voltage: ±11V relative to analog common
Over-Voltage Protection: ±35V
Ranges: Software or sequencer selectable on a per-channel basis, from 156 mV FS to 10V FS
Voltage Accuracy: One year, 0° to 35°C (exclusive of noise); for full-scale input ranges from 2.5V to 10V, accuracy is 0.015% of reading +0.005% of range. For full-scale input ranges from 312 mV to 1.25V, accuracy is 0.015% of reading +0.008% of range. For full-scale input of 156 mV, accuracy is 0.02% of reading +0.008% of range.

Thermocouple Inputs
Channels: 7 or 14 differential TC inputs
TC Types: J, K, S, T, E, B, R, N, or mV input
Input Voltage Range: ±100 mV
Input Impedance: 40M Ohm
Input Bandwidth: 4 Hz
Input Bias Current: 10 nA
CMRR: 100dB typ
Over Voltage Protection: ±40V
Voltage Accuracy: ±(0.2% of rdg + 50 µV)
TC Accuracy: See table above; valid for one year, 18°C to 28°C.
Minimum TC Resolution: 0.1°C for all TC types

Input Sequencer
Temperature, voltage, digital and frequency inputs can be scanned synchronously, based on either an internal programmable timer, or an external clock source.
Scan Clock Sources: 2
   1. Internal, programmable from 5 µs to 5.96 hours in 5 µs steps
   2. External, TTL level input up to 200 kHz max
Programmable Parameters per Scan: Channel (random order), gain, unipolar/bipolar
Depth: 512 locations
Channel-to-Channel Scan Rate: 5 or 10 µs per channel, programmable

Triggering
Trigger Sources: 6, individually selectable for starting and stopping an acquisition. Stop acquisition can occur on a different channel than start acquisition; stop acquisition can be triggered via modes 2, 4, 5, or 6 described below. Pre-trigger is supported with fixed or variable pre-trigger periods. See DaqBoard/2000 for details on triggering.

Analog Output
Up to four analog output channels can be updated synchronously relative to scanned inputs, and clocked from either an internal onboard clock, or an external clock source. Analog outputs can also be updated asynchronously, independent of any other scanning in the system. Bus Mastering DMA provides CPU and system-independent data transfers. This feature ensures accurate outputs that are irrespective of other system activities. Streaming from disk or memory is supported, which allows continuous, nearly infinite length, waveform outputs (limited only by available PC system resources).
Channels: 0, 2, or 4
Resolution: 16 bits
Output Voltage Range: ±10V
Output Current: ±10 mA
Offset Error: ±0.0045V max
Gain Error: ±0.01%
Update Rate: 100 kHz max, 1.5 Hz min (no minimum with external clock)
Settling Time: 10 µs max to 1 LSB for full-scale step
Clock Sources: 4, programmable
   1. Onboard D/A clock, independent of scanning input clock
   2. Onboard scanning input clock
   3. External D/A input clock, independent of external scanning input clock we should provide it
   4. External scanning input clock

Frequency/Pulse Counters
Counter inputs can be scanned synchronously along with voltage, TC and digital scanned inputs, based either on internal programmable timer, or an external clock source. Bus Mastering DMA provides CPU and system-independent data transfers, ensuring data acquisition performance irrespective of other system activities. Counters can be configured to clear when read, or to totalize and clear under program control.
Channels: 4 x 16-bit; cascadable as 2 x 32-bit
Frequency Measurement Rate: 10 MHz max
Input Signal Range: -15V to +15V
Trigger Level: TTL
Minimum Pulse Width: 50 ns high, 50 ns low

Frequency/Pulse Generators
Channels: 2 x 16-bit
Output Waveform: Square wave
Output Rate: 1-MHz base rate divided by 1 to 65535 (programmable)
High-Level Output Voltage: 2.0V min @ -3.75 mA; 3.0V min @ -2.5 mA
Low-Level Output Voltage: 0.4V max @ 2.5 mA

Ordering Information
Description **Part No.**
All DaqTemp systems include PCI measurement board, 3 ft. cable, signal conditioning pod, and software (see below). All programming documentation is included on the CD ROM supplied with the system.
7 differential TC inputs* DaqTemp/7
7 differential TC inputs, plus 2 analog outputs* DaqTemp/7A
14 differential TC inputs* DaqTemp/14
14 differential TC inputs, plus 4 analog outputs* DaqTemp/14A

Software
Software included with the DaqTemp consists of DaqView™, support for Visual Basic®, C/C++, ActiveX/COM, LabVIEW®, and DASYLab®
Optional software provides a direct link from DaqView™ and DASYLab® into Excel® spreadsheets DaqViewXL

For complete information on accessories and cables, visit
www.iotech.com/acc

* Additional I/O included with every system includes 7 differential voltage inputs, 24 digital I/O, 4 counter inputs, and 2 timer outputs

PC Data Acquisition Hardware