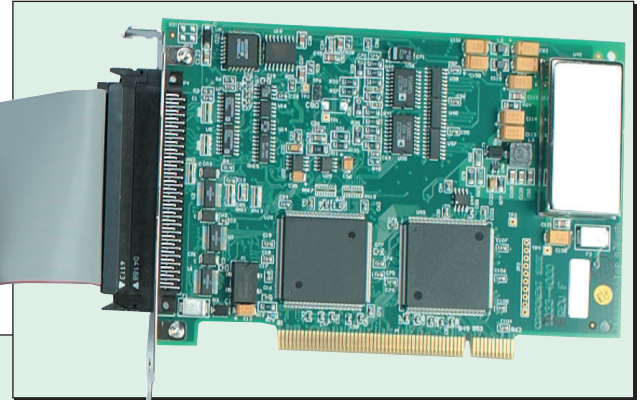# High-Accuracy PCI Thermocouple/ Multifunction Data Acquisition System
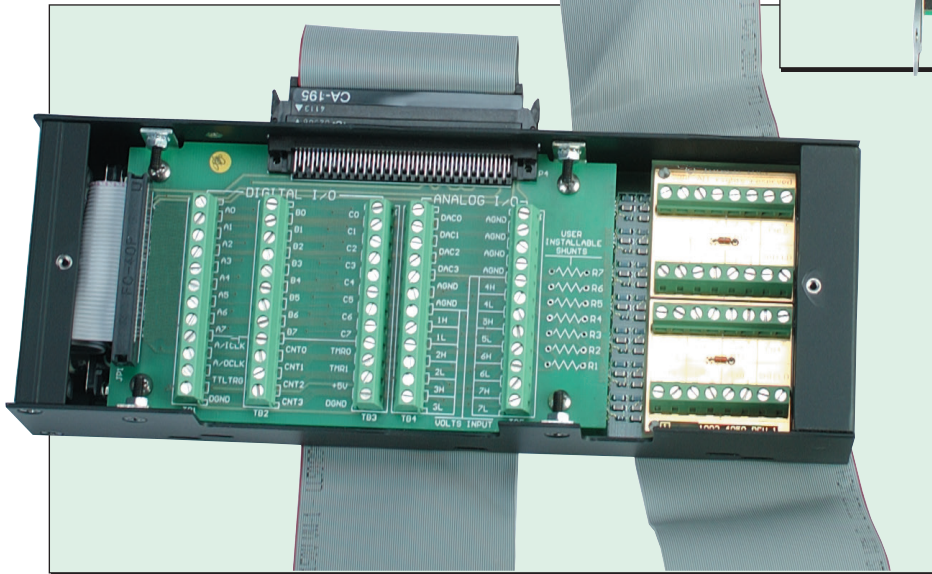
OMB-DAQTEMP14A

Product Discontinued

OMB-DAQTEMP14A, shown smaller than actual size, with screw terminal/signal conditioning pod included.

- ✔ **Includes a PCI Plug-n-Play Card, Screw-Terminal/ Signal Conditioning Pod, Cable, and Extensive Software Support**
- ✔ **14 Thermocouple Input Channels**
- ✔ **Supports Thermocouple Types J, K, S, T, B, E, N, R**
- ✔ **7 Differential Voltage Inputs, with 13 Programmable Ranges from ±156 mV to ±10 V Input**
- ✔ **200K Readings per Second—No Averaging Required**
- ✔ **24 Digital I/O lines**
- ✔ **4 Frequency/Pulse Counting Input Channels**
- ✔ **4-Channel, 16-Bit/100 kHz Analog Outputs**

- ✔ **100% Digital Calibration**
- ✔ **DaqView Software for Effortless Setup, Acquisition, and Real-Time Data Viewing**
- ✔ **Drivers for DASYLab, LabVIEW, Visual Basic, C++**

The OMB-DAQTEMP14A data acquisition card provides a total hardware/software/signal conditioning solution for high-accuracy, high-speed temperature, voltage, frequency, and pulse counting measurements, plus digital I/O and analog output.

A diversified software package is included with the OMB-DAQTEMP14A, including DaqView software, plus drivers for DASYLab, LabView, and Windows-based languages including Visual Basic and C++.

OMB-DAQTEMP14A hardware consists of a plug-n-play PCI board, a 0.9 m (3') cable, and a screw terminal/signal conditioning pod. Cold-junction compensation is built in to the OMB-DAQTEMP14A, allowing for highly accurate thermocouple measurements, with channel-to-channel variation and noise typically less than 0.2°C, and absolute accuracy typically better than 1.0°C. This is accomplished by having a separate low-noise, bandwidth-limited amplifier per thermocouple channel. The OMB-DAQTEMP14A has 14 thermocouple input channels. All power for the OMB-DAQTEMP14A is derived from the PC, so there is no need for external power supplies or transformers.

In addition to thermocouple inputs, the OMB-DAQTEMP14A features 7 differential voltage input channels, with 16-bit resolution and programmable full scale input ranges from ±156 mV to ±10 V. The 4 frequency input channels can measure frequency or count pulses up to 10 MHz. Two timer output channels can generate square 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.

* In order to provide maximum temperature stability, the thermocouple channels have a 4 Hz filter.

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The 16-bit/100 kHz analog outputs can be used to generate waveforms, with a virtually infinite waveform output length possible from PC memory.

All inputs and outputs are accessible via convenient screw terminals located on the signal conditioning pod. The user can easily remove the cover of the signal conditioning pod to gain access to the screw terminals for signal connections.

DAQVIEW SOFTWARE
The included DaqView software allows the user to verify signal connections, acquire and save data to disk, and graphically view real-time data within moments of installing the system. Easily set up all hardware, acquisition, and display parameters, without programming, via a simple, spreadsheet-style screen. DaqView is a full-featured acquisition and display application that provides all the functionality needed for many data logging applications.

OMB-DAQVIEW-XLPLUS
DaqViewXL is an optional Excel add-in that provides complete data acquisition functionality. Seamlessly integrated into Excel's tool palette, DaqViewXL has the same comprehensive acquisition and display capabilities as DaqView. Excel is an ideal tool for test engineers because it provides a variety of graph and charting functions for presenting data in a graphical format, as well as mathematical and analysis functions such as FFTs. Excel's ability to retrieve and manipulate previously acquired data in a spreadsheet format and DaqViewXL's advanced data acquisition functions form a comprehensive data acquisition solution.

Daqview Software (Included)

Specifications
GENERAL
Supply Voltage Range: 4.75 to 5.25 Vdc (from PCI bus)
Power Consumption: 5.5 W
Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -40 to 80°C (-40 to 176°F)
Relative Humidity: 0 to 95%, non-condensing
Vibration: MIL STD 810E
PCI Board Dimensions: 165 W x 15 D x 108 mm H (6.5 x 0.6 x 4.2")
Signal Conditioning/Screw Terminal Pod Dimensions: 86 W x 240 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
Non-Linearity (Integral): ±1 LSB
Non-Linearity (Differential): No missing codes

VOLTAGE INPUTS
Channels: 7 differential inputs, programmable on a per-channel basis for unipolar or bipolar
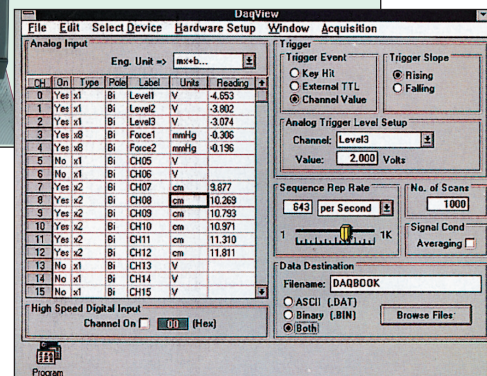**Ranges:** Software or sequencer selectable on a per-channel basis; 0 to 10 V, 0 to 5 V, 0 to 2.5 V, 0 to 1.25 V, 0 to 0.625 V, 0 to 0.3125 V, ±10 V, ±5 V, ±2.5 V, ±1.25 V, ±0.625 V, ±0.3125 V, ±0.156 V

Voltage Accuracy: One year, 0 to 35°C (32 to 95°F)(exclusive of noise). For full scale input ranges from 2.5 to 10 V, accuracy is 0.015% of reading + 0.005% of range. For full scale input ranges from 312 mV to 1.25 V, 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.
Bandwidth: 500 kHz
Settling Time: 5 µs to 1 LSB for full scale step
Temperature Coefficient: ±(10 ppm + 0.3 LSB)/°C
Input Impedance: 20 MΩ (differential)
Bias Current: <1 nA @ 0 to 35°C (32 to 95°F)
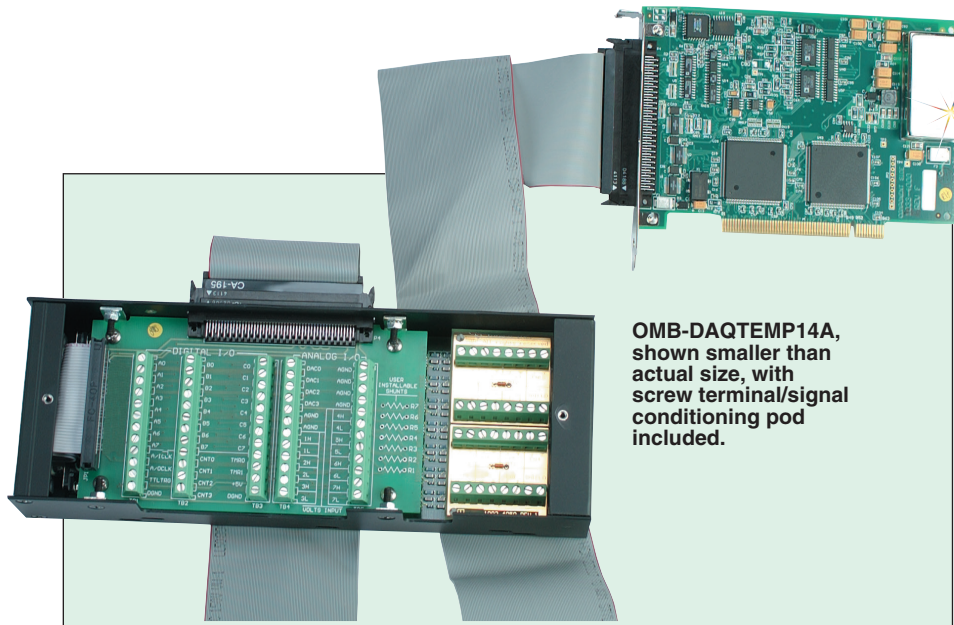**Common-Mode Rejection:** 86 dB, DC to 60 Hz for gains ≤8; >100 dB for gains ≥16
Maximum Input Voltage: ±11 V relative to analog common
Overvoltage Protection: ±35V
Crosstalk: 100 dB, DC to 60 Hz; 86 dB @ 10 kHz

	T/C Inputs	Voltage Inputs	Frequency Output	Pulse Outputs	Analog I/O	Digital
OMB-DAQTEMP14A	14	7	4	2	4	24

OMB-DAQTEMP14A, shown smaller than actual size, with screw terminal/signal conditioning pod included.

Input Signal Range: -10 to 10 V max
Trigger Level: Programmable (11-bit resolution)
Hysteresis: Programmable (11-bit resolution)
Latency: 5 us max

2. Single-Channel Analog Software Trigger
Any voltage or T/C input channel can be selected as the software trigger channel. If the trigger channel is a thermocouple, then the driver automatically compensates for the delay required to obtain the reading, resulting in a maximum latency of one scan period.

3. Single-Channel Digital Trigger
A separate digital input is provided for digital triggering.
Input Signal Range: -15 to 15 V
Trigger Level: TTL
Min Pulse Width: 50 ns high, 50 ns low
Latency: 5 μs max

4. Digital Pattern Triggering
8- or 16-bit pattern triggering on the digital input port. Programmable for trigger on equal, above, below, or within/outside of a window. Individual bits can be masked for "don't care" condition.
Latency: One scan period, max

5. Counter/Totalizer Triggering
Counter/totalizer inputs can trigger an acquisition. User can select to trigger on a frequency or on total counts that are equal, above, below, or within/outside of a window.
Latency: One scan period, max

6. Software Triggering
Trigger can be initiated under program control.

THERMOCOUPLE INPUTS
Channels: 14 differential T/C inputs
T/C Types: J, K, S, T, E, B R, N, or mV input
Input Voltage Range: ±100 mV
Input Impedance: 40 MΩ
Input Bandwidth: 4 Hz
Input Bias Current: 10 nA
CMRR: 100 dB typ.
Overvoltage Protection: ±40 V
Voltage Accuracy: ±(0.2% rdg + 50 μV)
T/C Accuracy: See table below; valid for one year, 18 to 28°C (64 to 82°F)
Minimum T/C resolution: 0.1°C for all T/C 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. Analog and digital outputs can be synchronized to either of these clocks.

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
External Acquisition Scan Clock Input
Maximum Rate: 200 kHz
Clock Signal Range: 0 to 5 V
Minimum Pulse Width: 50 ns high, 50 ns low

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.
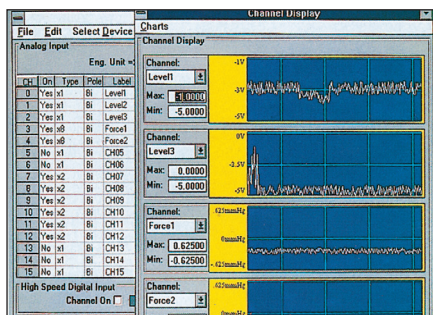
1. Single-Channel Analog Hardware Trigger
Any voltage or T/C input channel can be software programmed to be the analog trigger channel.

Thermocouple Accuracy at Measurement Temperature (°C)

Thermocouple Type	Min	Max	-100	0	100	300	500	700	900	1100	1400
J	-200	760	0.5	0.5	0.5	0.6	0.7	0.7	-	-	-
K	-200	1200	0.6	0.6	0.6	0.7	0.8	0.8	0.9	1.0	-
T	-200	400	0.6	0.6	0.6	0.6	-	-	-	-	-
E	-270	650	0.5	0.5	0.5	0.5	0.6	-	-	-	-
S	50	1768	1.8	2.3	1.8	1.5	1.5	1.4	1.5	1.6	1.6
R	-50	1768	1.6	2.3	1.6	1.5	1.4	1.3	1.3	1.4	1.5
B	50	1780	-	-	-	3.7	2.4	2.1	1.8	1.7	1.5
N28	-270	400	0.7	0.7	0.7	0.7	-	-	-	-	-
N14	0	1300	0.7	0.7	0.7	0.7	0.8	0.8	0.9	1.0	-

DaqView Software Real-Time Chart

OMB-DAQTEMP14A, shown smaller than actual size, with screw terminal/signal conditioning pod (included).

OMEGACARE℠ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE℠ covers parts, labor and equivalent loaners.

ANALOG OUTPUT

Up to 4 analog output channels can be updated synchronously relative to scanned inputs, and clocked from either an internal on-board clock or an external clock source. Analog outputs can also be updated asynchronously, independent of any other scanning in the system.

Channels: 4
Resolution: 16-bit
Output Voltage Range: ±10 V
Output Current: ±10 mA
**Offset Error:** ±0.0045 V 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. On-board D/A clock, independent of scanning input clock
  2. On-board scanning input clock
  3. External D/A input clock, independent of external scanning input clock
  4. External scanning input clock
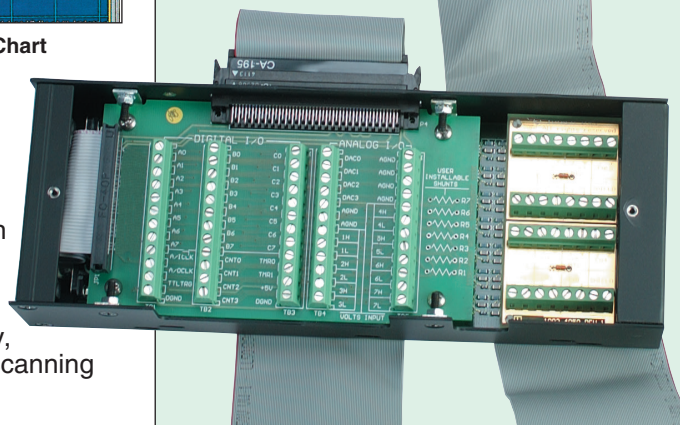
FREQUENCY/PULSE COUNTERS

Counter inputs can be scanned synchronously along with voltage, T/C, and digital scanned inputs, based on either internal programmable timer or an external clock source. 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: -15 to 15 V
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 65,535 (programmable)
High-Level Output Voltage:
2.0 V min @ -3.75 mA;
3.0 V min @ -2.5 mA
Low-Level Output Voltage:
0.4 V max @ 2.5 mA

DIGITAL I/O
Channels: 24
I/O Levels: TTL

To Order

Model No.	Description
OMB-DAQTEMP14A	14 differential thermocouple inputs, 7 differential voltage inputs plus 4 analog outputs
OMB-DAQVIEW-XLPLUS	Data acquisition software for Microsoft Excel (provides a direct link from DaqView into Excel spreadsheets)

All OMB-DAQTEMP14A systems include PCI measurement board, 0.9 m (3') cable, signal conditioning pod and software. All programming documentation is included on the CD-ROM supplied with the system. Additional I/O provided with every system includes 7 differential voltage inputs, 24 digital I/O, 4 counter inputs, 2 timer outputs and 4 analog outputs. Software included with the OMB-DAQTEMP14A includes DaqView, Windows drivers for Visual Basic and C++, and drivers for LabView and DASYLab.
***Ordering Example: OMB-DAQTEMP14A,** PCI-based data acquisition system with 14 differential thermocouple inputs plus 4 analog outputs and **OMEGACARE℠** 1-year extended warranty for the **OMB-DAQTEMP14A** (adds 1 year to standard 1-year warranty).*

OMEGACARE℠ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE℠ covers parts, labor and equivalent loaners.