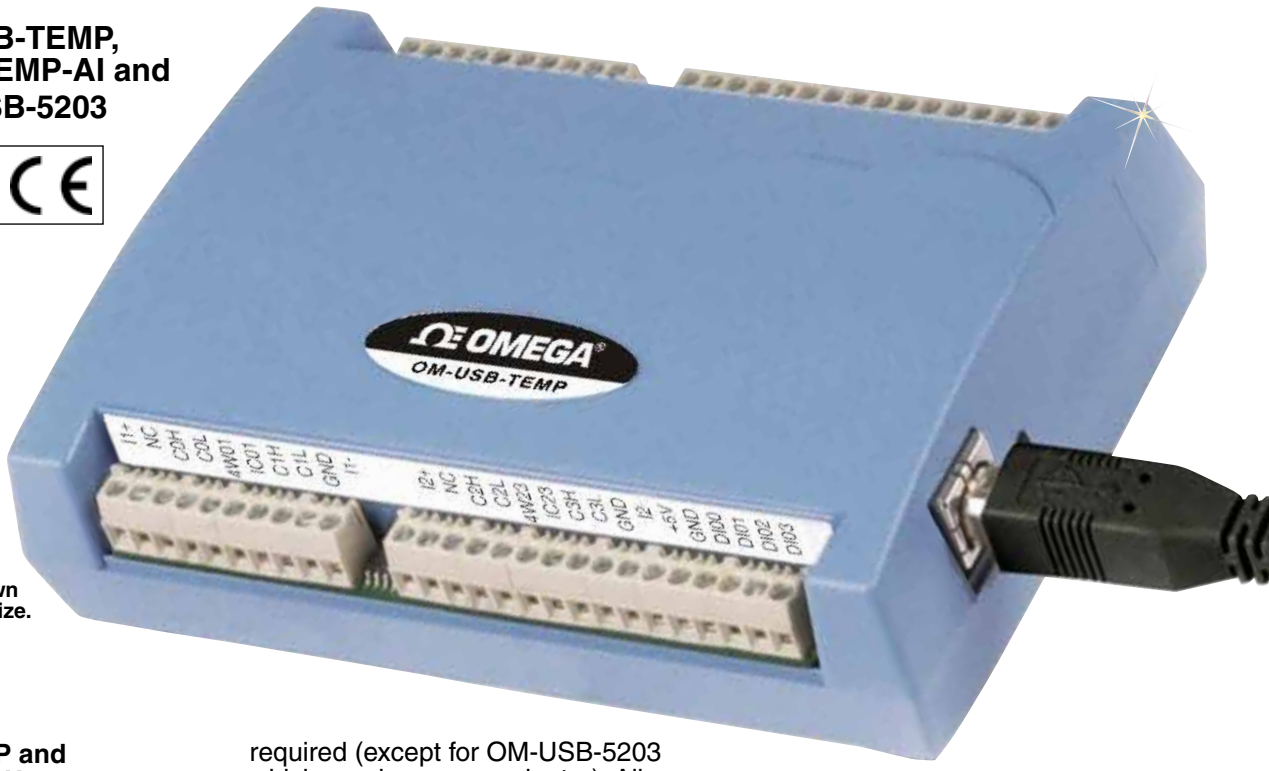
Eight Channel Temperature/Voltage Input USB Data Acquisition Modules

OM-USB-TEMP, OM-USB-TEMP-AI and OM-USB-5203

1 YEAR WARRANTY



OM-USB-TEMP, shown smaller than actual size.

- **OM-USB-TEMP and OM-USB-5203 Have 8 Temperature Inputs**
- **OM-USB-TEMP-AI has 4 Temperature Inputs and 4 Analog Voltage Inputs**
- **Temperature Inputs are Software Programmable for Thermocouple, RTD, Thermistor or Semiconductor Temperature Sensors**
- **OM-USB-5203 Has Data Logging Capability (Compact Flash)**
- **24-Bit Resolution**
- **Built-In Cold Junction Compensation and Open Circuit Detection for Thermocouple Inputs**
- **Eight Digital I/O**
- **No External Power Supply Required (Except for OM-USB-5203)**

The OM-USB-TEMP, OM-USB-TEMP-AI and OM-USB-5203 are USB 2.0 full speed temperature input data acquisition modules (fully compatible with both USB 1.1 and USB 2.0 ports).

These are plug-and-play modules which draw power from the USB cable–no external power supply is required (except for OM-USB-5203 which requires an ac adaptor). All configurable options are software programmable, and the modules are fully software calibrated.

The OM-USB-TEMP and OM-USB-5203 provide eight differential temperature input channels. The OM-USB-TEMP-AI provides eight analog input channels that are configured as four differential temperature inputs and four differential or single-ended voltage inputs.

Temperature inputs are software programmable for different sensor types including type J, K, T, E, R, S, B, N thermocouples, 2, 3 or 4-wire Pt100 RTDs, 2, 3 or 4-wire thermistors and semi-conductor sensors and are configured in blocks of two channels. A different type of sensor (thermocouple, RTD, thermistor, semiconductor) can be connected to each block of two channels (both channels must be the same type).

If the block of two channels is set up for thermocouple inputs, it is possible to mix thermocouple types. For example, an OM-USB-TEMP can be configured for 4 RTD inputs and 4 thermocouple inputs but not for 3 RTD inputs and 5 thermocouple inputs.

These modules have integrated cold junction compensation (CJC), linearization and open circuit detection for thermocouple measurements (OM-USB-TEMP and OM-USB-5203 have two integrated CJC sensors and the OM-USB-TEMP-AI has one CJC sensor. Voltage inputs (OM-USB-TEMP-AI only) are software programmable for ±10V, ±5V, ±2.5V and ±1.25V ranges.

Eight independent, TTL-compatible digital I/O channels are provided to monitor TTL-level inputs, communicate with external devices and to generate alarms. The digital I/O channels are software programmable for input or output.

The OM-USB-5203 features eight independent temperature alarms. Each alarm controls an associated digital I/O channel as an alarm output. The input to each alarm is any one of the temperature input channels.

The output of each alarm is software configurable as active high or low. The temperature threshold condition to activate each alarm is user programmable. When an alarm is activated, the associated digital I/O channel is driven to the output state.

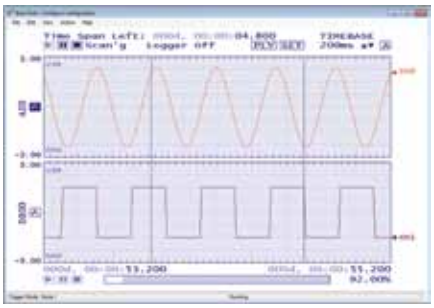
The OM-USB-5203 also has data logging capability. Measurements can be logged to a standard CompactFlash memory card (a 512 MB CompactFlash memory card is included with the OM-USB-5203). Data logging can only be done when the OM-USB-5203 is disconnected from the computer. External power is required for data logging via the included ac adaptor. User programmable settings in data logging mode include sampling interval and logging start mode (on power up, on button press or at a specified data and time).

Software

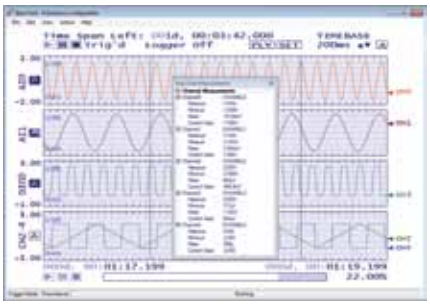
The OM-USB-TEMP, OM-USB-TEMP-AI and OM-USB-5203 modules ship with an impressive array of software, including TracerDAQ®, a full-featured, out-of-the-box data logging, viewing, and analysis application. Driver support and detailed example programs are included for Universal Library programming libraries for Microsoft® Visual Studio® programming languages, and other languages, including DASYLab®, and ULx for NI LabVIEW® (comprehensive library of VIs and example programs compatible with 32-bit and 64-bit LabVIEW 2010 or later) and InstaCal™ installation, calibration and test utility-powerful solutions for programmers and nonprogrammers alike. These modules operate under Microsoft Windows® VISTA/7/8/10 (32-bit and 64-bit) operating systems.

The The OM-USB-TEMP, OM-USB-TEMP-AI and OM-USB-5203data acquisition modules are supplied with TracerDAQ software which is a collection of four virtual instrument applications used to graphically display and store input data and generate output signals:

- Strip Chart—Log and graph values acquire from analog inputs, digital inputs, temperature inputs and counter inputs
- Oscilloscope—Display values acquired from analog inputs
- Function Generator—Generate waveforms for analog outputs
- Rate Generator—Generate waveforms for counter outputs



TracerDAQ Strip Chart.



TracerDAQ Pro Strip Chart with Measurements.

TracerDAQ PRO is an enhanced version of TracerDAQ and is available as a purchased upgrade (SWD-TRACERDAQ-PRO).

A comparison of some of the features included in TracerDAQ vs TracerDAQ PRO is shown below.

Strip Chart

Feature	TracerDAQ	TracerDAQ PRO
Channel Types	Analog Input, Temperature Temperature Input, Digital Input, Event Counter	Analog Input, Temperature Input, Digital Input, Event Counter
Number of Channels	8	48
Number of Lanes	2	8
Maximum Samples Per Channel	32,000	1 milllion
Alarm Conditions	No	Yes
Measurements Window	No	Yes
Enter Annotations	No	Yes
Software Triggering	No	Yes
Hardware Triggering	No	Yes
Time-of-Day Triggering	No	Yes
Linear Scaling	No	Yes

Oscilloscope

Feature	TracerDAQ	TracerDAQ PRO
Channel Type	Analog input	Analog input
Number of Channels	2	4
Measurements Window	No	Yes
Reference Channel	No	Yes
Math Channel	No	Yes

Function Generator

Feature	TracerDAQ	TracerDAQ PRO
Channel Type	Analog output	Analog output
Number of Channels	1	16
Waveform Types	Sine	Sine, square, triangle, flat, pulse, ramp, random, Arbitrary
Duty Cycle	No	Yes
Phase	No	Yes
Gate Ratio	No	Yes
Rate Multiplier	No	Yes
Sweep (Linear and Exponential)	No	Yes

Rate Generator

Feature	TracerDAQ	TracerDAQ PRO
Channel Type	Counter output	Counter output
Number of Channels	1	20

SPECIFICATIONS

ANALOG INPUTS

A/D Converter:
OM-USB-TEMP/OM-USB-5203: Four dual 24-bit sigma delta A/D converters
OM-USB-TEMP-AI: Dual 24-bit sigma-delta A/D converters

Input Isolation: 500 Vdc minimum between field wiring and USB interface

Number of Channels:
OM-USB-TEMP/OM-USB-5203: 8 differential temperature inputs
OM-USB-TEMP-AI: 4 differential temperature inputs and 4 differential or single-ended voltage inputs

Thermocouple Input: Software programmable for type J, K, T, E, R, S, B, N

Pt100 RTD Input: 2, 3 or 4-wire DIN 43760, α = 0.00385, SAMA, α = 0.003911, ITS-90/IEC751, α = 0.0038505

Thermistor Input: 2, 3 or 4-wire standard 2252 through 30,000 Ω

Semiconductor Sensor: TMP36 or equivalent

Maximum Input Voltage: Temperature inputs; ±25V (power on), ±40V (power off): voltage inputs; ±25V (power on), ±15V (power off)

Throughput Rate: 2 samples/sec max for all active channels

Input Impedance: Temperature inputs; 5 GΩ (power on), 1 MΩ (power off): voltage inputs; 10 GΩ (power on), 2.49 KΩ (power off)

Input Leakage Current: Thermocouples inputs; 105 nA maximum (with open thermocouple detection enabled), 30 nA maximum (with open thermocouple detection disabled): voltage inputs; ±1.5 nA typ, ±25 nA max

Maximum Working Voltage (OM-USB-TEMP-AI Voltage Inputs): ±10.25V max (input signal + common mode)

Common Mode Rejection Ratio: Temperature inputs, 100 dB minimum; voltage inputs, 83 dB minimum

Warm-Up Time: 30 minutes maximum

Compatible Thermocouple Input Types

Type	Temperature Range	Accuracy* (Typical, °C)	
		OM-USB-TEMP-AI	OM-USB-TEMP OM-USB-5203
J	-210 to 1200°C (-346 to 2192°F)	±0.71 @ -210°C ±0.28 @ 0°C ±0.29 @ 1200°C	±0.51 (-210 to 0°C) ±0.31 (0 to 1200°C)
K	-210 to 1372°C (-346 to 2502°F)	±0.76 @ -210°C ±0.28 @ 0°C ±0.39 @ 1372°C	±0.54 (-210 to 0°C) ±0.35 (0 to 1372°C)
T	-200 to 400°C (-328 to 752°F)	±0.74 @ -200°C ±0.29 @ 0°C ±0.21 @ 400°C	±0.51 (-200 to 0°C) ±0.26 (0 to 400°C)
E	-200 to 1000°C (-328 to 1832°F)	±0.68 @ -200°C ±0.32 @ 0°C ±0.24 @ 1000°C	±0.46 (-200 to 0°C) ±0.25 (0 to 1000°C)
R	-50 to 1768°C (-58 to 3214°F)	±0.46 @ -50°C ±0.19 @ 250°C ±0.13 @ 1768°C	±0.65 (-50 to 250°C) ±0.36 (250 to 1768°C)
S	-50 to 1768°C (-58 to 3214°F)	±0.44 @ -50°C ±0.20 @ 250°C ±0.16 @ 1768°C	±0.65 (-50 to 250°C) ±0.40 (250 to 1768°C)
B	250 to 1820°C (482 to 3308°F)	±2.19 @ 250°C ±0.82 @ 700°C ±0.47 @ 1820°C	±0.58 (250 to 700°C) ±0.37 (700 to 1820°C)
N	-200 to 1300°C (-328 to 2372°F)	±0.76 @ -200°C ±0.28 @ 0°C ±0.25 @ 1300°C	±0.50 (-200 to 0°C) ±0.27 (0 to 1000°C)

** Includes cold junction compensation measurement error. Dependent on A/D data rate.*

Semiconductor Sensor Measurement Accuracy

Sensor Type	Temperature Range	Maximum Error
TMP36 or Equivalent	-40 to 150°C (-40 to 302°F)	± 0.50°C

Open Thermocouple Detection: Automatically enabled when a channel is configured for a thermocouple sensor

CJC Sensor Accuracy: ±0.25°C typical, ±0.5°C max (15 to 35°C); -1.0 to 0.75°C max (0 to 70°C)

DC Voltage Input Ranges (OM-USB-TEMP-AI Only)

Range	Absolute Accuracy (mV)
± 10V	± 2.78
± 5V	± 1.40
± 2.5V	± 0.71
±1.25V	± 0.36

RTD Measurement Accuracy

Temperature Range	OM-USB-TEMP OM-USB-5203 Typical Error (°C)	OM -USB-TEMP-AI Typical Error (°C)
-200 to -150°C (-328 to -238°F)	± 2.59	± 2.78 @-200°C, ±1.07 @-150°C
-150 to -100°C (-238 to -148°F)	± 0.97	± 1.07 @-150°C, ±0.35 @-100°C
-100 to 0°C (-148 to 32°F)	± 0.31	± 0.35 @-100°C, ±0.12 @0°C
0 to 100°C (32 to 212°F)	± 0.11	± 0.12 @ 0°C, ±0.13 @ 100°C
100 to 300°C (212 to 572°F)	± 0.12	± 0.13 @100°C, ±0.14 @ 300°C
300 to 600°C (572 to 1112°F)	± 0.12	± 0.14 @300°C, ±0.15 @ 600°C

Thermistor Measurement Accuracy

Thermistor	Temperature Range	OM-USB-TEMP, OM-USB-5203 Maximum Error (°C)	OM-USB-TEMP-AI Maximum Error (°C)
2252 Ω	-40 to 120°C (-40 to 248°F)	± 0.05	± 0.001 @ -40°C, ±3.47 @ 120°C
3000 Ω	-40 to 120°C (-40 to 248°F)	± 0.05	—
5000 Ω	-35 to 120°C (-31 to 248°F)	± 0.05	± 0.001 @ -35°C, ±1.54 @ 120°C
10000 Ω	-25 to 120°C (-13 to 248°F)	± 0.05	± 0.001 @ -25°C, ±0.77 @ 120°C
30000 Ω	-10 to 120°C (14 to 248°F)	± 0.05	± 0.001 @ -10°C, ±0.27 @ 120°C

DIGITAL I/O
Number of Digital I/O Channels: 8
Type: CMOS
Configuration: Each DI/O bit can be independently configured for input or output. Power on reset is input mode.
Pull-Up/Pull-Down Configuration: All pins pulled up to +5V via 47 kΩ resistors (default). Pull-down to ground (GND) also available.
Digital I/O Transfer Rate (Software Paced): Digital input; 50 port reads or single bit reads per second (typical), digital output; 100 port writes or single bit writes per second (typical).
Input High Voltage: 2.0V min, 5.5V absolute maximum
Input Low Voltage: 0.8V min, -0.5V absolute minimum
Output High Voltage: 0.7V maximum (IOL = 2.5 mA)
Output Low Voltage: 3.8V minimum (IOH = -2.5 mA)

COUNTER
(OM-USB-TEMP-AI ONLY)
Number of Channels: 1
Resolution: 32-bit
Counter Type: Event counter
Input Type: TTL, rising edge triggered
Counter Read/Write Rates (Software Paced, System Dependent): 33 to 1000 read/writes per second
Schmitt Trigger Hysteresis: 20 mV to 100 mV
Input Leakage Current: ±1.0 µA typical
Input Frequency: 1 MHz maximum
High Pulse Width: 500 ns minimum
Low Pulse Width: 500 ns minimum
Input High Voltage: 4.0V minimum, 5.5V absolute maximum
Input Low Voltage: 1.0V maximum, -0.5V absolute minimum

DATA LOGGING
(OM-USB-5203 ONLY)
Memory Card Type: CompactFlash (512 MB card included)
Logging Rate: 1 sec up to 2^{32} seconds (1 sec intervals)
Logging Start Method: On power up, on button press or at specified date/time (user programmable)
Logging Stop Method: Button press

GENERAL
Power Supply Voltage (Supplied by USB Port): 4.75V minimum to 5.25V maximum

OM-USB-5203, shown smaller than actual size.

OMEGA CARE℠ Extended Warranty Program

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.

Power Supply Current (Supplied by USB Port): <100 mA typical (USB enumeration); 270 mA typical (continuous input with all inputs configured for disabled mode)
User 5V Output Voltage Range (connected to self-powered hub):
OM-USB-TEMP/OM-USB-5203; 4.75V min to 5.25V maximum
OM-USB-TEMP-AI; 4.9 V minimum to 5.1 V maximum
User 5V Output Current (bus powered and connected to self-powered hub):
OM-USB-TEMP/OM-USB-5203; 10 mA maximum
OM-USB-TEMP-AI; 5 mA maximum
Isolation: 500 Vdc minimum measurement system to PC
USB Device Type: USB 2.0 (full-speed)

Device Compatibility: USB 1.1, USB 2.0
USB Cable Length: 3 m (10') maximum
Dimensions: 127 L x 89 W x 36 mm H (5.0 x 3.5 x 1.4")
Input Connections: Screw terminal blocks (accept 16 to 30 AWG wire)
Operating Temperature: 0 to 50°C (32 to 122°F), 0 to 90% RH non-condensing
Storage Temperature: -40 to 85°C (-40 to 185°F)
Weight:
OM-USB-TEMP/OM-USB-TEMP-AI: 182 g (6.4 oz)
OM-USB-5203: 227 g (8.0 oz)

To Order *Visit omega.com/om-usb-temp for Pricing and Details*

MODEL NO.	DESCRIPTION
OM-USB-TEMP	8-channel temperature input USB data acquisition module
OM-USB-TEMP-AI	8-channel temperature/voltage input USB data acquisition module
OM-USB-5203	8 channel temperature input USB data acquisition module with data logging capability
SWD-TRACERDAQ-PRO	TracerDAQ Pro software
OM-USB-5200-ADAPTOR	Spare 100/240 Vac 50/60 Hz ac adaptor for OM-USB-5203 (USA plug)

Comes complete with 2 m (6') USB cable and software and operator's manual on CD. OM-USB-5203 also includes 100/240 Vac 50/60 Hz ac adaptor (USA plug) and 512 MB Compact Flash card.

***Ordering Example: OM-USB-TEMP,** 8-channel temperature input USB data acquisition module and OMEGACARE℠ **OCW-1,** 1 year extended warranty adds 1 year to standard 1 year warranty.*