

8-Channel High Speed Voltage Input USB Data Acquisition Modules

**OM-USB-1208HS,
OM-USB-1208HS-2AO,
OM-USB-1208HS-4AO**



- ✓ 4 Differential/8 Single-Ended Analog Voltage Inputs
- ✓ 13-Bit Resolution
- ✓ Up to 4 Analog Outputs
- ✓ 16 Digital I/O
- ✓ Two 32-Bit Counters
- ✓ No External Power Supply Required

OM-USB-1208HS, shown smaller than actual size.

The OM-USB-1208HS, OM-USB-1208HS-2AO and OM-USB-1208HS-4AO are USB 2.0 full-speed voltage input data acquisition modules (fully compatible with both USB 1.1 and USB 2.0 ports). These are stand-alone plug-and-play modules which draw power from the USB cable—no external power supply is required. All configurable options (including individual channel ranges) are software programmable, and the modules are fully software calibrated.

All three OM-USB-1208HS modules provide 13-bit resolution, and 4 differential or 8 single-ended analog inputs. These modules support software programmable ranges from ± 5 to ± 20 V in a differential configuration, and ± 2.5 to ± 10 V, and 0 to 10V in a single-ended configuration. In software-paced mode, these modules can sample at a maximum of 4 kS/s. In hardware-paced mode, they can sample at a maximum of 1 MS/s.

The OM-USB-1208HS-2AO provides two 12-bit analog outputs, and the OM-USB-1208HS-4AO provides four 12-bit analog outputs.

Both modules offer an output range of ± 10 V. Analog outputs update at a maximum rate of 5 kS/s in software-paced mode; in hardware-paced mode, each analog output updates at a maximum rate of 1 MS/s.

On these modules, 16 digital I/O can be programmed on each individual bit as either inputs or outputs. Each module supports two 32-bit TTL-level counters that accept frequency inputs of up to 20 MHz.

The packaging for the OM-USB-1208HS, OM-USB-1208HS-2AO and OM-USB-1208HS-4AO ensures ease of use in a variety of applications. The modules can easily be DIN-rail mounted for rack applications.

Software

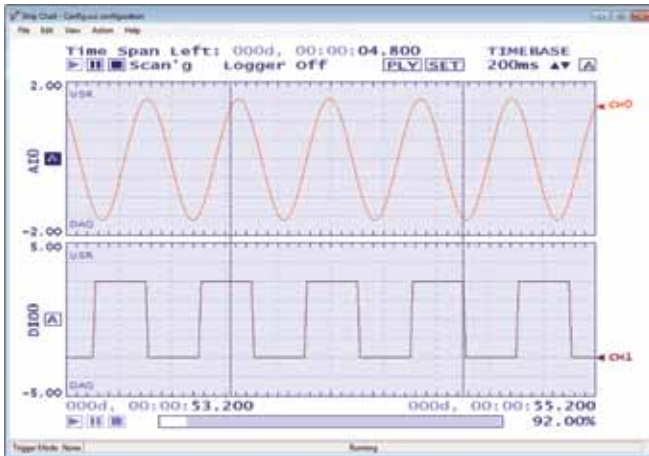
The OM-USB-1208HS, OM-USB-1208HS-2AO and OM-USB-1208HS-4AO modules ship with an impressive array of software, including TracerDAQ[®], a full-featured, out-of-the-box data logging, viewing, and analysis application. Driver support and detailed example programs are included for Universal Library programming 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.

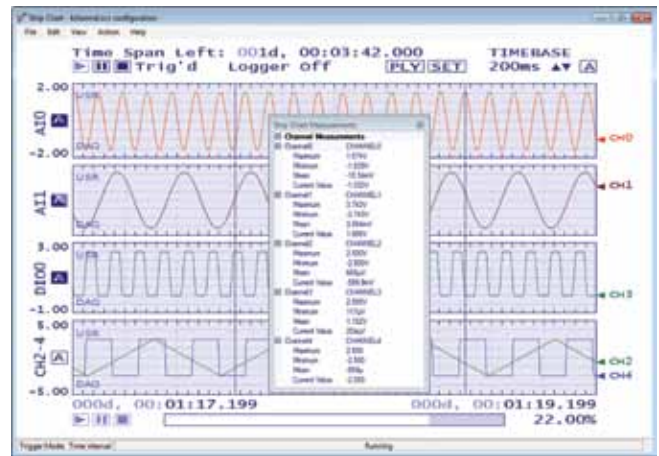
The OM-USB-1208HS, OM-USB-1208HS-2AO and OM-USB-1208HS-4AO data acquisition modules are supplied with TracerDAQ software which is a collection of four virtual instrument applications used to graphically display and store input data and generate output signals:

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



TracerDAQ Strip Chart.



TracerDAQ Pro Strip Chart with Measurements.

SWD-TRACERDAQ-PRO, sold separately.

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

Features Comparison Strip Chart

Features	TracerDAQ	TracerDAQ Pro
Channel Types	Analog input, 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 million
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

Features	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

Rate Generator

Features	TracerDAQ	TracerDAQ Pro
Channel Type	Counter output	Counter output
Number of Channels	1	20

Function Generator

Features	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

SPECIFICATIONS

ANALOG INPUT

A/D Converter: Successive approximation type

Input Ranges: Software selectable per channel

Differential: $\pm 20V$, $\pm 10V$, $\pm 5V$ (the voltage level on each individual AIN input is limited to $\pm 14V$)

Single Ended: $\pm 10V$, $\pm 5V$, $\pm 2.5V$, 0 to 10V

Number of Channels:

4 differential/8 single-ended (software-selectable)

Input Configuration: Multiplexed

Channel Gain Queue: 8 unique consecutive elements, software-configurable range for each channel

Absolute Maximum Input Voltage: Chx IN to GND

Power On: $\pm 25V$ maximum

Power Off: $\pm 12V$ maximum

Input Impedance: 35 M Ω minimum

Input Bandwidth (-3 dB):

All input ranges, 2 MHz typical

Input Leakage Current:

± 250 nA typ

Input Capacitance: 32 pf typical

Maximum Working Voltage:

(Signal + Common Mode)

$\pm 20V$: $\pm 14V$, $\pm 10V$: $\pm 11V$,

$\pm 5V$: $\pm 5.5V$

Sampling Rate: 1 S/s to 1 MS/s, software programmable

Sample Clock Source:

Internal A/D clock or AICKI

Burst Mode: Software-selectable, burst rate = 1 μ s

Throughput

Software-Paced: 33 to 4000 S/s type, system-dependent

Hardware-Paced:

1 MS/s maximum

Resolution: 13-bits

A/D No Missing Codes

(Uncalibrated)

Differential (Mode): 13-bits

Single Ended (Mode): 12-bits

CMRR: 60 Hz, 74 dB typical

ANALOG OUTPUT

D/A Converter: DAC7553

Number of Channels:

4 independent

Resolution: 12-bits

Output Range

Calibrated: $\pm 10V$

Uncalibrated: $\pm 10.2V$

D/A Update Rate

Software Paced: 33 to 5000 S/s typ, system dependent

Hardware Paced: 1 MHz maximum (per channel)

DC Voltage Analog Input Ranges and Absolute Accuracy (Single-Ended Mode)

Voltage Range	Absolute Accuracy (LSB)
$\pm 10V$	± 5.10 typ, ± 8.06 maximum
$\pm 5V$	± 2.63 typ, ± 4.03 maximum
$\pm 2.5V$	± 1.59 typ, ± 2.70 maximum
0 to 10V	± 3.29 typ, ± 5.13 maximum

Sample Clock Source: Internal D/A clock or AOCKI (AO external clock input pin)

Monotonicity: 12-bits

Output Current: ± 3 mA maximum per channel

Power Up and Reset State: 0V

Output Noise: 0.53 mV rms

Absolute Accuracy: $\pm 0.1\%$

Slew Rate: 6.7V/ μ s typical

DIGITAL I/O

Digital Type: CMOS

Number of I/O: 16

Configuration: Each bit may be configured as input (power on default) or output

Pull-Up Configuration: The port has 47 k Ω resistors configurable as pull-ups or pull-downs by an internal jumper (default setting is pull-down)

Digital I/O Transfer Rate (System Paced): 33 to 8000 port reads/writes or single-bit reads/writes per second typical, system dependent.

Input High Voltage: 2.0V minimum 5.5V absolute maximum

Input Low Voltage: 0.8V maximum -0.5V absolute minimum, 0V recommended minimum

Output High Voltage: 4.4V minimum (IOH = -50 μ A), 3.76V minimum (IOH = -24 mA)

Output Low Voltage: 0.1V maximum (IOL = 50 μ A), 0.44V maximum (IOL = 24 mA)

Output Current: ± 24 mA maximum per terminal

EXTERNAL TRIGGER

Trigger Source: TRIG input

Trigger Mode: Software configurable for edge- or level-sensitive, rising or falling edge, high or low level. Power on default is edge sensitive, rising edge.

Trigger Latency: 1 μ s + 1 clock cycle maximum

Trigger Pulse Width: 100 ns minimum

Input Type: Schmitt trigger, 33 Ω series resistor and 47 k Ω pull-down to ground

DC Voltage Analog Input Ranges and Absolute Accuracy (Differential Mode)

Voltage Range	Absolute Accuracy (LSB)
$\pm 20V$	± 9.55 typ, ± 13.18 maximum
$\pm 10V$	± 4.59 typ, ± 6.23 maximum
$\pm 5V$	± 2.25 typ, ± 2.75 maximum

Schmitt Trigger Hysteresis:

0.4 to 1.2V

Input High Voltage: 2.2V minimum, 5.5V absolute maximum

Input Low Voltage: 1.5V maximum, -0.5V absolute minimum, 0V recommended minimum

EXTERNAL ACQUISITION

SCAN CLOCK I/O

Terminal Names:

AICKI, AICKO, AOCKI, AOCKO

Terminal Types

AxCKI: Input, active on rising edge

AxCKO: Output, power on default is 0V, active on rising edge

Terminal Descriptions

AxCKI: Receives sampling clock from external source

AxCKO: Outputs internal sampling clock (D/A or A/D clock) or pulse generated from AxCKI when in external clock mode

Input Clock Rate: 1 MHz maximum

Clock Pulse Width

AxCKI: 400 ns minimum

AxCKO: 400 ns minimum

Input Type: Schmitt trigger,

33 Ω series resistor, 47 k Ω pull-down to ground

Schmitt Trigger Hysteresis:

0.4 to 1.2V

Input High Voltage: 2.2V minimum, 5.5V absolute maximum

Input Low Voltage: 1.5V maximum, -0.5V absolute minimum, 0V recommended minimum

Output High Voltage:

4.4V minimum (IOH = -50 μ A), 3.76V minimum (IOH = -24 mA)

Output Low Voltage:

0.1V maximum (IOL = 50 μ A), 0.44V maximum (IOL = 24 mA)

Output Current: ± 24 mA maximum per terminal

COUNTERS

Counter Terminal Names:

CTR0, CTR1

Counter Type: Event counter

Number of Channels: 2

Input Type: Schmitt trigger,

33 Ω series resistor, 47 k Ω pull-down to ground

Schmitt Trigger Hysteresis:

0.4 to 1.2V

Input High Voltage: 2.2V minimum, 5.5V absolute maximum

Input Low Voltage: 1.5V maximum, -0.5V absolute minimum, 0V recommended minimum

Resolution: 32-bits

Maximum Input Frequency: 20 MHz

Counter Read/Write Rates

(Software Paced): 33 to 8000 reads/writes per second typ, system dependent

High Pulse Width: 25 ns minimum

Low Pulse Width: 25 ns minimum

TIMER

Timer Terminal Name: TMR

Timer Type: PWM output with count, period, delay, and pulse width registers

Output Value: Default state is idle low with pulses high, software-selectable output invert

Internal Clock Frequency:

40 MHz

Register Widths: 32-bits

High Pulse Width: 20 ns minimum

Low Pulse Width: 20 ns minimum

Output High Voltage: 4.4V minimum (IOH = -50 μ A), 3.76V minimum (IOH = -24 mA)

Output Low Voltage: 0.1V

maximum (IOL = 50 μ A), 0.44V maximum (IOL = 24 mA)

Output Current: \pm 24 mA maximum per pin

MEMORY

Data FIFO: 4 kS analog input/4 kS analog output

Non-Volatile Memory: 32 KB (16 KB firmware storage, 16 KB calibration/user data)

POWER

Operating Modes: Bus-powered, USB 5V supply



OM-USB-1208HS, shown smaller than actual size.

Supply Current: Total current consumption including 5V, and digital output and analog output currents

Suspend Mode: <2.5 mA

Enumeration: <100 mA

Run Mode: <500 mA

Power Consumption Excluding Analog and Digital Outputs

Run Mode: 1.175 W maximum (235 mA input current)

Power Available for 5V, AICKO, AOCKO, TMR, Analog Outputs, Digital I/O:

Run Mode: 1.325 W maximum

+5 V Output Voltage Range:

Run Mode: 4.5V minimum, 5.25V maximum

Suspend Mode, Enumeration: 0V

+5V Output Current (Run Mode, No Other Output Loads):

265 mA maximum (1.325 W)

USB SPECIFICATIONS

USB Device Type: USB 2.0

(high-speed)

USB Device Compatibility:

USB 1.1, 2.0

USB Cable Length: 5 m (16.4') maximum

GENERAL

Operating Temperature

Range: 0 to 50°C (32 to 122°F)

Storage Temperature

Range: -40 to 85°C (-40 to 185°F)

Humidity: 0 to 90% RH

non-condensing

Communications:

USB 2.0 (high-speed)

Acquisition Data Buffer: 4 kS

Signal I/O Connector: 2 banks of screw-terminal blocks

Dimensions:

127 L x 89.9 W x 35.6 mm H (5.00 x 3.53 x 1.40")

Weight: 160 g (5.6 oz)



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

To Order

Model No.	Description
OM-USB-1208HS	High speed multifunction USB data acquisition module with eight 13-bit 1 MS/s analog inputs
OM-USB-1208HS-2AO	1 high speed multifunction USB data acquisition module with eight 13-bit 1 MS/s analog inputs and two 12-bit 1 MS/s analog outputs
OM-USB-1208HS-4AO	High speed multifunction USB data acquisition module with eight 13-bit 1 MS/s analog inputs and four 12-bit 1 MS/s analog outputs
SWD-TRACERDAQ-PRO	TracerDAQ Pro software

Comes complete with 2 m (6') USB cable, Quick Start Guide, TracerDAQ software, and operator's manual on CD.

Ordering Example: OM-USB-1208HS high speed multifunction USB data acquisition module with eight 13-bit 1 MS/s analog inputs and OCW-1 OMEGACARESM 1 year extended warranty (adds 1 year to standard 1 year warranty).