

8-Channel Voltage Input USB Data Acquisition Modules

**OM-USB-1208FS,
OM-USB-1408FS**



- ✓ Low Cost, Multifunction USB Devices with 4 Differential or 8 Single-Ended Analog Inputs
- ✓ Provides 12-Bit (OM-USB-1208FS) or 14-Bit (OM-USB-1408FS) Analog Input Resolution
- ✓ Maximum Sampling Rates Ranging from 1.2 kS/s to 50 kS/s
- ✓ 2 Analog Outputs
- ✓ 16 Digital I/O Lines
- ✓ One 32-Bit Counter Input Channel
- ✓ No External Power Required

The OM-USB-1208FS and OM-USB-1408FS data acquisition modules offer four differential (DIFF) or eight single-ended (SE) analog inputs, two analog outputs, 16 digital I/O channels, and one counter input.

These modules 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 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.

Both modules feature eight analog voltage input channels that are processed through a single A/D converter. The analog inputs to the OM-USB-1208FS are software configurable for either eight 11-bit single-ended or four 12-bit differential inputs. The analog inputs to the OM-USB-1408FS are software configurable for either eight 13-bit single-ended or four 14-bit differential inputs.

These modules have one 32-bit counter channel. The digital I/O channels are software programmable for input or output. Both models have two 12-bit analog outputs. The packaging for the OM-USB-1208FS and OM-USB-1408FS ensures ease of use in a variety of applications.



TracerDAQ Strip Chart.



TracerDAQ Pro Strip Chart with Measurements.

OM-USB-1208FS shown actual size.

The OM-USB-1208FS and OM-USB-1408FS 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. A comparison of some of the features included in TracerDAQ vs TracerDAQ PRO is shown on the next page.



Features Comparison Strip Chart

Feature	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

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

SOFTWARE

OM-USB-1208FS and OM-USB-1408FS modules ship with an impressive array of software, including the new 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 v8.5 through 2013) and InstaCal™ installation, calibration and test utility - powerful solutions for programmers and nonprogrammers alike. These modules operate under

Microsoft Windows® XP (32-bit only) and VISTA/7/8 (32-bit and 64-bit) operating systems.

ANALOG INPUT

OM-USB 1208FS: These devices provide eight, 11-bit single-ended analog inputs or four, 12-bit differential analog inputs.

OM-USB 1408FS: These devices provide eight, 13-bit single-ended analog inputs or four, 14-bit differential analog inputs.

All devices support software selectable ranges that provide inputs from $\pm 1V$ to $\pm 20V$ in a differential configuration, and $\pm 10V$ in a single-ended configuration.



OM-USB-1208FS/OM-USB-1408FS					
Model	Analog Inputs	Sampling Rate	Analog Outputs	Digital Output	Event Counters
OM-USB-1208FS	8 SE/4 DIFF	50 kS/s max	2	±6.0 mA per Pin	1
OM-USB-1408FS	8 SE/4 DIFF	48 kS/s max	2	±6.0 mA per Pin	1

GENERAL INFORMATION

SAMPLING RATE: When scanning continuously to computer memory (hardware-paced mode), the OM-USB-1208FS can sample at a maximum of 50 kS/s, and the OM-USB-1408FS can sample at a maximum of 48 kS/s.

CHANNEL-GAIN QUEUE

The channel-gain queue feature lets you configure a list of channels and gains for each scan. Each channel can have a different gain setting. The gain settings are stored in a channel-gain queue list that is written to local memory on the device.

The OM-USB-1208FS and OM-USB-1408FS channel-gain queue can contain up to 16 channels listed in any order.

ANALOG OUTPUT

The maximum analog output update rate for all devices depends on several factors, including USB port speed. Both devices offer two 12-bit analog outputs with a range of 0V to 4.096V.

When updating continuously from computer memory (hardware-paced mode), one analog output updates at a maximum rate of 10 kS/s; two analog outputs update simultaneously at a maximum rate of 5 kS/s each.

DIGITAL I/O

All devices provide 16 TTL-level digital I/O lines. Digital I/O can be programmed on each 8-bit port (Port A and Port B) for either input (default) or output.

EVENT COUNTER INPUT

Each device supports one 32-bit TTL-level counter that accepts inputs up to 1 MHz.

SPECIFICATIONS

ANALOG INPUT

A/D Converter Type: Successive approximation

Channels: 8 single-ended (SE) or 4 differential (DIFF), software programmable

Input Common-Mode Voltage Range for Linear Operation:

SE Mode: CHx to GND, ±10V max

DIFF Mode: CHx to GND, -10V min, 20V max

Absolute Maximum Input Voltage: CHx to GND, ±28V max

Input Impedance: 122 kΩ

Ranges: Software selectable on a per-channel basis

SE Mode: ±10V

DIFF Mode: ±20V, ±10V, ±5V, ±4V, ±2.5V, ±2.0V, ±1.25V, ±1.0V

Throughput: Maximum throughput scanning to computer memory depends on the computer being used.

Software Paced: 250 S/s typ, system-dependent

Hardware Paced:

OM-USB-1208FS: 50 kS/s

OM-USB-1408FS: 48 kS/s

Channel Gain Queue: Up to 16 elements, software-selectable channel and range

Resolution:

OM-USB-1208FS:

DIFF: 12 bits, no missing codes

SE: 11 bits

OM-USB-1408FS:

DIFF: 14 bits, no missing codes

SE: 13 bits

CAL Accuracy (OM-USB-1208FS Only):

CAL = 2.5 V, ±36.25 mV max

Integral Linearity Error

OM-USB-1208FS: ±1 least significant bit (LSB) typ

OM-USB-1408FS: ±2 LSB typ

Differential Linearity Error: ±0.5 LSB typ

Repeatability: ±1 LSB typ

CAL Current (OM-USB-1208FS Only):

Source: 5 mA max

Sink: 20 µA min, 100 µA typ

2.5VREF Accuracy (OM-USB 1408FS Only):

±36.25 mV max

2.5VREF Output Current (OM-USB 1408FS Only):

Source: 5 mA max

Sink: 20 µA min, 100 µA typ

Trigger Source (Software-Selectable):

External Digital: TRIG_IN

Clock Source: Internal; External (SYNC), rising edge triggered

Analog Input Accuracy: OM-USB-1208FS	
Range	Accuracy (LSB)
Differential Mode	
±20V	5.1
±10V	6.1
±5V	8.1
±4V	9.1
±2.5V	12.1
±2V	14.1
±1.25V	20.1
±1V	24.1
Single-Ended Mode	
±10V	4.0



Analog Input Accuracy: OM-USB-1408FS		
Range	Absolute Accuracy 25°C	Absolute Accuracy 0 to 50°C
Differential Mode		
±20V	±10.98 mV	±49.08 mV
±10V	±7.32 mV	±33.42 mV
±5V	±3.66 mV	±20.76 mV
±4V	±2.92 mV	±19.02 mV
±2.5V	±1.83 mV	±14.97 mV
±2V	±1.70 mV	±14.29 mV
±1.25V	±1.21 mV	±12.18 mV
±1V	±1.09 mV	±11.63 mV
Single-Ended Mode		
±10V	±10.98 mV	±49.08 mV

Noise Performance: OM-USB-1208FS		
Range	Typical Counts	Least Significant Bit-Root Mean Square (LSB _{RMS})
Differential Mode		
±20V	2	0.30
±10V	2	0.30
±5V	3	0.45
±4V	3	0.45
±2.5V	4	0.61
±2V	5	0.76
±1.25V	7	1.06
±1V	8	1.21
Single-Ended Mode		
±10V	2	0.30

Analog Input Accuracy Components: OM-USB-1208FS				
Range	% of Reading	Gain Error at Full Scale (mV)	Offset (mV)	Accuracy at Full Scale (mV)
Differential Mode				
±20V	0.2	40	9.766	49.766
±10V	0.2	20	9.766	29.766
±5V	0.2	10	9.766	19.766
±4V	0.2	8	9.766	17.766
±2.5V	0.2	5	9.766	14.766
±2V	0.2	4	9.766	13.766
±1.25V	0.2	2.5	9.766	12.266
±1V	0.2	2	9.766	11.766
Single-Ended Mode				
±10V	0.2	20	19.531	39.531

Noise Performance: OM-USB-1408FS		
Range	Typical Counts	Least Significant Bit-Root Mean Square (LSB _{RMS})
Differential Mode		
±20V	8	1.21
±10V	8	1.21
±5V	9	1.36
±4V	10	1.51
±2.5V	12	1.81
±2V	14	2.12
±1.25V	18	2.72
±1V	22	3.33
Single-Ended Mode		
±10V	8.0	1.21

ANALOG OUTPUT

Number of Channels: 2

Output Range: 0V to 4.096V, 1 mV per LSB

Resolution: 12 bits, 1 in 4096

Throughput: Maximum throughput scanning to computer memory depends on the computer being used

Software Paced: 250 S/s single channel typ, system-dependent

Hardware Paced:

Single Channel: 10 kS/s

Dual Channel: 5 kS/s

Power On and Reset Voltage

OM-USB-1208FS: Initializes to 000h code

OM-USB-1408FS: 0V, ±20 mV typ, initializes to 000h code

Output Drive (Each D/A OUT): 15 mA

Slew Rate: 0.8V/μs typ

Accuracy (All Values are ±): 0V to 4.096V: 4.0 LSB typ, 45.0 LSB max

Analog Output Accuracy Components (All Values are ±): 0V to 4.096V

% of FSR: 0.1 typ, 0.9 max

Gain Error at Full Scale: 4.0 mV typ, 36.0 mV max

Offset: 1.0 mV typ, 9.0 mV max

Accuracy at Full Scale: 4.0 mV typ, 45.0 mV max



OM-USB-1408FS
shown actual size.

DIGITAL I/O

Digital Type: CMOS

Number of I/O: 16 (Port A0 through A7, Port B0 through B7)

Configuration: 2 banks of 8

Pull Up/Pull-Down Configuration: All pins pulled up to 5V through 47 k Ω resistors (default); change to pull-down using internal user-configurable jumpers.

Input High Voltage: 2.0V min, 5.5V absolute max

Input Low Voltage: 0.8V max, -0.5V absolute min, 0V recommended min

Output High Voltage (IOH = -6.0 mA): 3.84V min

Output Low Voltage (IOL = 6.0 mA): 0.33V max

Power On and Reset State: Input

EXTERNAL TRIGGER

Trigger Source: External digital, TRIG_IN

Trigger Mode: Edge sensitive; software-selectable for CMOS-compatible rising or falling edge

Trigger Latency: 10 μ s max

Trigger Pulse Width: 1 μ s min

Input Type: Schmitt trigger, 47 k Ω pull-down to ground

Schmitt Trigger Hysteresis: 1.01V typ, 0.6V min, 1.5V max

Input High Voltage Threshold: 2.43V typ, 1.9V min, 3.1V max

Input High Voltage Limit: 5.5V absolute max

Input Low Voltage Threshold: 1.42V typ, 1.0V min, 2.0V max

Input Low Voltage Limit: -0.5V absolute min, 0V recommended min

EXTERNAL CLOCK INPUT/OUTPUT

Pin Name: SYNC

Pin Type: Bidirectional

Direction (Software-Selectable):

Input (Default): Receives A/D clock from external source; active on rising edge

Output: Outputs internal A/D clock; active on rising edge

Input Clock Rate:

OM-USB-1208FS: 50 kHz, max

OM-USB-1408FS: 48 kHz, max

Clock Pulse Width:

Input Mode: 1 μ s min

Output Mode: 5 μ s min

Input Type: Schmitt trigger, 47 k Ω pull-down to ground

Schmitt Trigger Hysteresis: 1.01V typ, 0.6V min, 1.5V max

Input High Voltage Threshold: 2.43V typ, 1.9V min, 3.1V max

Input High Voltage Limit: 5.5V absolute max

Input Low Voltage Threshold: 1.42V typ, 1.0V min, 2.0V max

Input Low Voltage Limit: -0.5V absolute min, 0V recommended min

Output High Voltage: 4.4V min (IOH = -50 μ A), 3.80V min (IOH = -8 mA)

Output Low Voltage: 0.1V max (IOL = 50 μ A), 0.44V max (IOL = 8 mA)



COUNTER

Number of Channels: 1

Counter Type: Event counter

Pin name: CTR

Input Type: Schmitt trigger, 47 kΩ pull-down to ground

Input Source: CTR screw terminal

Resolution: 32 bits

Maximum Input Frequency: 1 MHz

High Pulse Width: 500 ns min

Low Pulse Width: 500 ns min

Schmitt Trigger Hysteresis: 1.01V typ, 0.6V min, 1.5V max

Input High Voltage Threshold: 2.43V typ, 1.9V min, 3.1V max

Input High Voltage Limit: 5.5V absolute max

Input Low Voltage Threshold: 1.42V typ, 1.0V min, 2.0V max

Input Low Voltage Limit: -0.5V absolute min, 0V recommended min

POWER

Supply Current: 80 mA (total current requirement; includes up to 10 mA for the status LED)

+5V USB Power Available:

Connected to Self-Powered Hub: 4.5V min, 5.25V max

Connected to Bus-Powered Hub: 4.1V min, 5.25V max

Output Current (total amount of current that can be sourced from the USB 5 V, analog outputs and digital outputs):

Connected to Self-Powered Hub or Externally Powered Root Port Hub: 420 mA max

Connected to Bus-Powered Hub: 20 mA max

NON-VOLATILE MEMORY

EEPROM: 1024 bytes



TracerDAQ Strip Chart.



TracerDAQ Pro Strip Chart with Measurements.

GENERAL

Operating Temperature Range: 0 to 70°C (32 to 158°F), 0 to 90% RH non-condensing

Storage Temperature Range: -40 to 70°C (-40 to 158°F), 0 to 90% RH non-condensing

Communications: USB 2.0 Hi-speed mode (480 Mbps) is recommended; otherwise USB 1.1 full-speed mode (12 Mbps)

Microcontroller Type: High performance 32-bit RISC

Signal I/O Connector Type: Screw terminal

USB Cable Length: 3 m (9.84') max

Dimensions: 79 L x 82 W x 27 mm H (3.10 x 3.20 x 1.05")

Weight: 91 g (3.2 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-1208FS	12-bit voltage input USB data acquisition module (4 DE/8 SE analog input channels, 16 digital I/O, 1 counter, 2 analog outputs)
OM-USB-1408FS	14-bit voltage input USB data acquisition module (4 DE/8 SE analog input channels, 16 digital I/O, 1 counter, 2 analog outputs)
SWD-TRACERDAQ-PRO	TracerDAQ Pro software
SWD-DASYLAB	DASyLab software

Comes complete with a 1.8 m (6') USB cable, TracerDAQ software and user manual on CD.

Ordering Example: OM-USB-1208FS 12-bit voltage input USB data acquisition module (4 DE/8 SE analog input channels, 16 digital I/O, 1 counter, 2 analog outputs) and OCW-1, OMEGACARESM extends standard 1-year warranty to a total of 2 years.