NEW

4, 8, or 16-Channel Analog Voltage Output USB Data Acquisition Modules

OM-USB-3100 Series

1 YEAR WARRANTY CE

- ✔ **4, 8, or 16 Analog Voltage Outputs**
- ✔ **16-Bit Resolution**
- ✔ **100 S/s Update Rate**
- ✔ **8 Digital I/O, One 32-Bit Counter/Timer**
- ✔ **Synchronous DAC Updates**

The new OM-USB-3101, OM-USB-3103, and OM-USB-3105 are voltage output USB 2.0 full-speed modules. Each module provides 4, 8, or 16 voltage outputs. All modules provide synchronous and concurrent voltage updates.

All OM-USB-3100 Series modules provide eight digital I/O lines and one 32-bit event counter and are powered by the 5V USB supply from the computer.

OM-USB-3101 shown smaller than actual size.

Analog Output

All OM-USB-3100 Series modules provide either 4, 8, or 16 channels of 16-bit analog output.

Each channel is software-selectable for either a bipolar voltage output range of ±10 V or unipolar range of 0 to 10V. Channel outputs can be updated individually or simultaneously.

Software

The OM-USB-3100 Series 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 2012) 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 AND 8 (32-bit and 64-bit) operating systems.

Synchronous DAC Updates

All OM-USB-3100 Series modules have a synchronous DAC load connection pin (SYNCLD) that simultaneously updates DAC outputs on multiple devices. You can configure this with software as an input (slave mode) or as an output (master mode).

In slave mode, the SYNCLD pin receives the D/A LOAD signal from an external source. When the SYNCLD pin receives the trigger signal, the analog outputs are updated simultaneously.

In master mode, the internal D/A LOAD signal is sent to the SYNCLD pin. You can then synchronize with a second device of the same type and simultaneously update the DAC outputs on each device.

On power up and reset, the SYNCLD pin is set to slave mode (input).
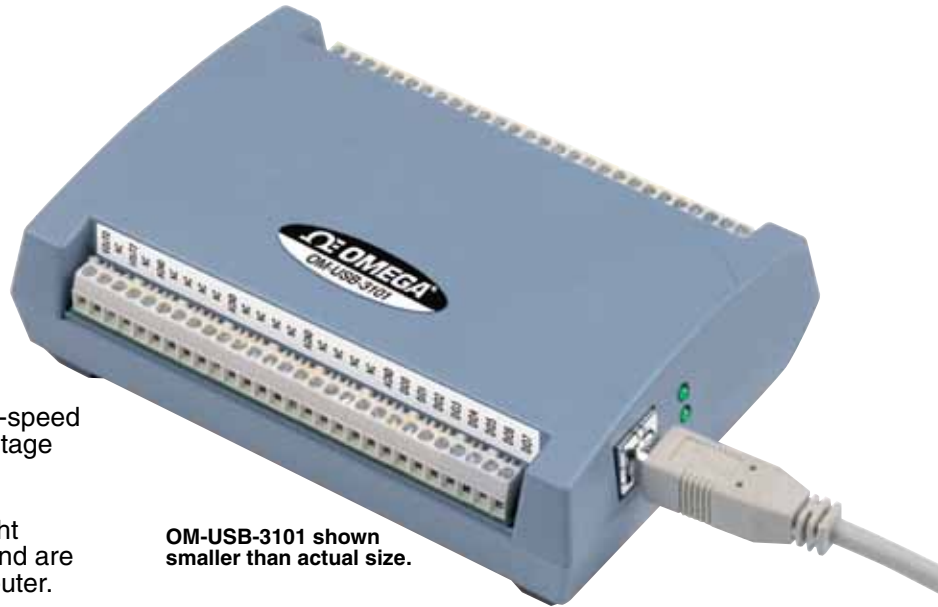
Digital I/O

All OM-USB-3100 Series modules have eight bidirectional digital I/O connections. The digital DIO lines can be independently programmed for input or output. All digital pins are floating by default. A screw terminal connection is provided to configure for pull-up (5V) or pull-down (0V).

Counter Input

Each OM-USB-3100 Series module has a 32-bit event counter for counting TTL pulses. The counter increments when the TTL levels transition from low to high. The counter accepts frequency inputs of up to 1 MHz.

SPECIFICATIONS

ANALOG VOLTAGE OUTPUT
D/A Converter: DAC8554
Number of Channels:
   OM-USB-3101: 4
   OM-USB-3103: 8
   OM-USB-3105: 16
Output Ranges (Software-Selectable):
   Calibrated: ±10V, 0V to 10V
   Uncalibrated: ±10.2V, -0.04V to 10.08V
Resolution: 16 bits

Absolute Accuracy Components–Calibrated Output

Range	% of Reading	Offset	Temperature Drift (%/°C)	Absolute Accuracy at FS
±10V	±0.0183	±1.831 mV	0.00055	±3.661 mV
0 to 10V	±0.0183	±0.915 mV	0.00055	±2.746 mV

Absolute Accuracy (Calibrated Output):
   ±10V: ±4.0 LSB
   0 to 10V: ±22.0 LSB
Relative Accuracy (±LSB):
   ±10V, 0 to 10V: 4.0 typical, 12.0 maximum

Output Transient
(±10V to 0 to 10V or 0 to 10V to ±10V):
Range Selection: The output voltage level defaults to 0V when the output voltage range is reconfigured, the host computer is reset, shut down, or suspended, or a reset command is issued to the device.

Duration: 5 µs typical
Amplitude: 5V p-p typical

Host Computer is Reset, Powered On, Suspended, or a Reset Command is Issued to Device:
The duration of this output transient is depends highly on the enumeration process of the host computer. Typically, the output is stable after two seconds.

Duration: 2 s typical
Amplitude: 2V p-p typical

Initial Power On:

Duration: 50 ms typical
Amplitude: 5V peak typical

Differential Nonlinearity: The maximum differential nonlinearity specification applies to the entire operating temperature range. This specification also accounts for the maximum errors due to the software calibration algorithm (in calibrated mode only) and the DAC8554 nonlinearities)

Calibrated: ±1.25 LSB typical, -2 LSB to 1 LSB maximum

Uncalibrated: ±0.25 LSB typical, ±1 LSB maximum

Output Current (VOUTx Pins): ±3.5 mA typical

Output Short-Circuit Protection (VOUTx Connected to AGND): Indefinite

Output Coupling: DC

Power On and Reset State:

DACs Cleared to Zero-Scale: 0V, ±50 mV typical
Output Range: 0 to 10V

Output Noise:

0 to 10V Range: 14.95 µVrms typical
±10V Range: 31.67 µVrms typical

Settling Time (To 1 LSB Accuracy): 25 µS typical

Slew Rate:

0 to 10V Range: 1.20V/µS typical
±10V Range: 1.20V/µS typical

Throughput:

Single-Channel: 100 S/s maximum, system-dependent

Multichannel: 100 S/s/#ch maximum, system-dependent

ANALOG OUTPUT CALIBRATION
Recommended Warm-Up Time: 15 minutes minimum on-board precision reference

DC Level: 5.000V ±1 mV maximum
Tempco: ±10 ppm/°C maximum
Long-Term Stability: ±10 ppm/SQRT(1000 hrs)

Calibration Method: Software calibration
Calibration Interval: 1 year

DIGITAL I/O
Digital Logic Type: CMOS
Number of I/O: 8

Configuration: Independently-configured for input or output

Pull-Up/Pull-Down Configuration: Software-selectable; all pins floating (default). For pull-down, connect the DIO CTL pin to a DGND pin. For pull-up, connect the DIO CTL pin to the 5V pin.

Digital I/O Input Loading: TTL (default); 47 KΩ (pull-up/pull down configurations)

Digital I/O Transfer Rate (System-Paced): System-dependent, 33 to 1000 port reads/writes or single bit reads/writes per second.

Input High Voltage: 2.0V minimum, 5.5V absolute maximum

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

Output High Voltage (IOH = -2.5 mA): 3.8V minimum
Output Low Voltage (IOL = 2.5 mA): 0.7V maximum
Power On and Reset State: Input

SYNCHRONOUS DAC LOAD
Pin Name: SYNCLD (terminal block pin 49)
Power On and Reset State: Input
Pin Type: Bidirectional
Termination: Internal 100 K pull-down
Software-Selectable Direction:

Output: Outputs internal D/A LOAD signal
Input: Receives D/A LOAD signal from external source

Input Clock Rate: 100 Hz maximum
Clock Pulse Width:

Input: 1 µs minimum
Output: 5 µs minimum

Input Leakage Current: ±1.0 µA typ

Input High Voltage: 4.0V minimum, 5.5V absolute maximum

Input Low Voltage: 1.0V maximum, -0.5V absolute minimum

Output High Voltage:

IOH: -2.5 mA: 3.3V minimum
No Load: 3.8V minimum
SYNCLD is a Schmitt trigger input and is over-current protected with a 200 Ω series resistor

Output Low Voltage:

IOL: 2.5 mA: 1.1V maximum
No Load: 0.6V maximum
When SYNCLD is in input mode, the analog outputs may either be updated immediately or when a positive edge is seen on the SYNCLD pin (this is under software control). However, the pin must be at a low logic level in order for the DAC outputs to be updated immediately. If an external source is pulling the pin high, no update occurs.

COUNTER
Pin Name: CTR
Number of Channels: 1
Resolution: 32-bits
Counter Type: Event counter
Input Type: TTL, rising edge triggered
Counter Read/Write Rates (Software-Paced): System dependent, 33 to 1000 reads per second

Schmidt Trigger Hysteresis: 20 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

MEMORY
EEPROM: 256 bytes
EEPROM Configuration:
  Address Range: 0x000-0x0FF
  Access: Read/write
  Description: 256 bytes user data

MICROCONTROLLER
Type: High performance 8-bit RISC microcontroller
Program Memory: 16,384 words
Data Memory: 2048 bytes

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

Storage Temperature: -40 to 85°C (-40 to 185°F)
Communications: USB 2.0 full-speed mode (12 Mbps)
Signal I/O Connector: Screw terminals
Power:
  Supply Current (USB Enumeration): <100 mA
  Supply Current (Quiescent): Total quiescent current requirement includes up to 10 mA for the status LED. This does not include any potential loading of the digital I/O bits, 5V user terminal, or the VOUTx outputs.
  OM-USB-3101: 140 mA typical
  OM-USB-3103: 160 mA typical
  OM-USB-3105: 200 mA typical
5V User Output Voltage Range: 4.5 to 5.25V (assumes USB power supply is within specified limits)
5V User Output Current: 10 mA maximum (refers to the total amount of current that can be sourced from the 5V user terminal for general use; also includes any additional contribution due to DIO loading
Dimensions: 127 L × 88.9 W × 35.6 H mm (5.0 × 3.5 × 1.4")
Weight: 159 g (0.35 lb)

The OM-USB-3100 Series 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 below.

TracerDAQ Strip Chart.

TracerDAQ Pro Strip Chart with Measurements.

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

OM-USB-3103

OM-USB-3105
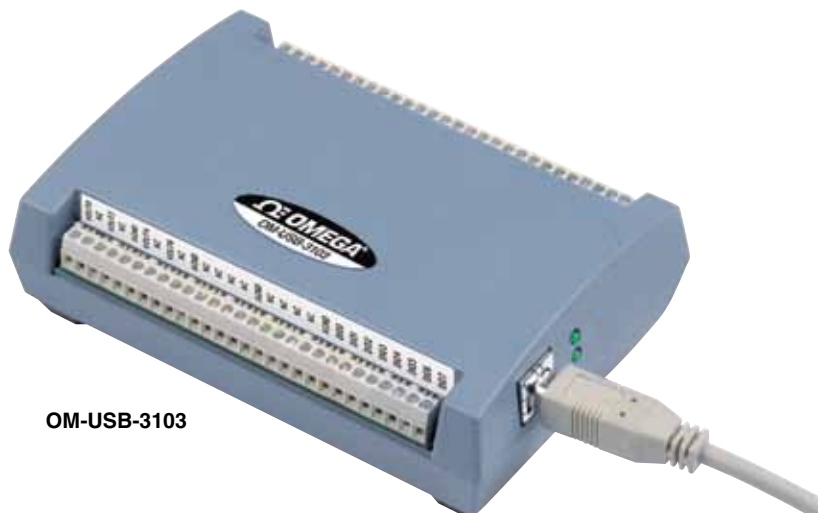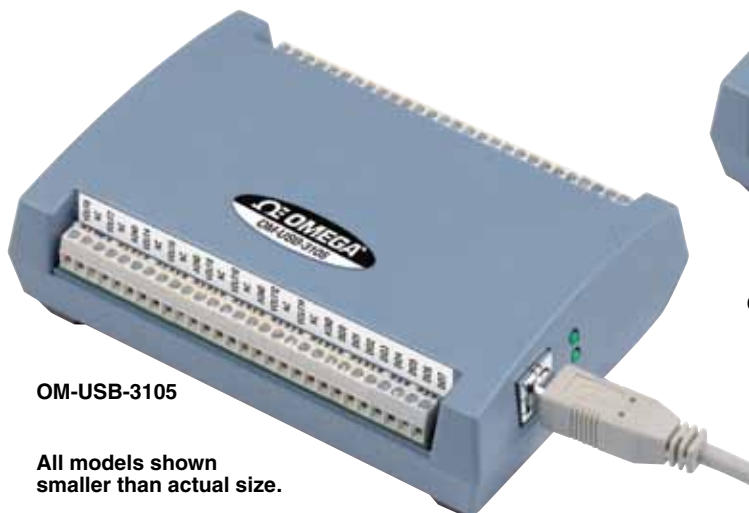
**All models shown
smaller than actual size.**

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

To Order

Model No.	Description
OM-USB-3101	4-channel, 16-bit analog voltage output USB module
OM-USB-3103	8-channel, 16-bit analog voltage output USB module
OM-USB-3105	16-channel, 16-bit analog voltage output USB module
SWD-TRACERDAQ-PRO	TracerDAQ Pro software

Comes complete with 2 m (6') USB cable and software and operator's manual on CD.
***Ordering Example: OM-USB-3101,** 4-channel, 16-bit analog voltage output USB module and **OCW-1,** OMEGACARE extends standard 1 year warranty to a total of 2 years.*