USB-1208FS/LS/1408FS Series
12-bit and 14-bit Multifunction Devices with 8 Analog Inputs, 2 Analog Outputs

MEASUREMENT COMPUTING

Features

- Low cost, multifunction USB devices with 4 differential or 8 single-ended analog inputs (software-selectable)
- Provides 12-bit or 14-bit 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

Software

- TracerDAQ® software included for acquiring and displaying data and generating analog signals
- Universal Library includes support for Visual Studio® and Visual Studio® .NET, including examples for Visual C++®, Visual C#®, Visual Basic®, and Visual Basic® .NET
- InstaCal software utility for installing, calibrating, and testing
- ULx for NI LabVIEW™
- DAQFlex open-source software framework – includes support for Linux®, and Mac® platforms (USB-1208FS-Plus/1408FS-Plus only)
- Comprehensive drivers for DASYLab®
- USB-1208LS/1208FS/1408FS supported by MATLAB® Data Acquisition Toolbox™
- Supported Operating Systems: Windows® 8/7/Vista®/XP SP2, 32-bit or 64-bit

All devices in this series offer eight singled-ended or four differential analog inputs, two analog outputs, 16 digital I/O, and one counter input. The USB-1208FS-Plus/1408FS-Plus also include eight high-current (24 mA) digital I/O connections and DAQFlex support.

Overview

This product series consists of the following low-cost, analog and digital I/O devices:

- USB-1208LS
- USB-1208FS and USB-1208FS-Plus
- USB-1408FS and USB-1408FS-Plus

All of these devices offer four differential (DIFF) or eight single-ended (SE) analog inputs, two analog outputs, 16 digital I/O channels, and one counter input.

Everything you need to begin acquiring, viewing, and storing data is included with these devices, including comprehensive software support.

Analog Input

USB-1208LS/1208FS/1208FS-Plus: These devices provide eight, 11-bit SE analog inputs or four, 12-bit DIFF analog inputs.

USB-1408FS/1408FS-Plus: These devices provide eight, 13-bit SE analog inputs or four, 14-bit DIFF analog inputs.

All devices support software-selectable ranges that provide inputs from ±1 V to ±20 V in a DIFF configuration, and ±10 V in a SE configuration.

USB-1208FS/LS/1408FS Series Selection Chart							
Model	Analog Inputs	Sampling Rate	Analog Outputs	Concurrent AI/AO Scanning Operations	Digital Output	Event Counters	DAQFlex Support
USB-1208LS	8 SE/4 DIFF	1.2 kS/s max	2		±2.5 mA per Pin	1	–
USB-1208FS	8 SE/4 DIFF	50 kS/s max	2		±6.0 mA per Pin	1	–
USB-1208FS-Plus	8 SE/4 DIFF	50 kS/s max	2	✔	±6.0 mA per Pin (Port A) ±24.0 mA per Pin (Port B)	1	✔
USB-1408FS	8 SE/4 DIFF	48 kS/s max	2		±6.0 mA per Pin	1	–
USB-1408FS-Plus	8 SE/4 DIFF	48 kS/s max	2	✔	±6.0 mA per Pin (Port A) ±24.0 mA per Pin (Port B)	1	✔

USB-1208FS/LS/1408FS Series
General Information

Sampling Rate

USB-1208LS: When scanning continuously to computer memory (hardware-paced mode), the USB-1208LS can sample at a maximum of 1.2 kS/s. Burst mode into the 4 kS FIFO is also available at rates up to 8 kS/s.

USB-1208FS/1208FS-Plus and USB-USB-1408FS/1408FS-Plus: When scanning continuously to computer memory (hardware-paced mode), the USB-1208FS/1208FS-Plus can sample at a maximum of 50 kS/s, and the USB-1408FS/1408FS-Plus 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 USB-1208LS channel-gain queue list can contain up to eight channels in SE mode and up to four channels in DIFF mode. The channels can be listed in any order.

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

The USB-1208FS-Plus and USB-1408FS-Plus channel-gain queue can contain up to eight unique channels in SE mode and up to four unique channels in DIFF mode. The channels can be non-consecutive, but must be listed in increasing order.

Analog Output

The maximum analog output update rate for all devices depends on several factors, including USB port speed.

USB-1208LS: This device offers two 10-bit analog outputs with a range of 0 V to 5 V.

One analog output updates at a maximum rate of 100 S/s; two analog outputs update at a maximum rate 50 S/s each. The USB-1208LS updates in software-paced mode only.

USB-1208FS and USB-USB-1408FS: Both devices offer two 12-bit analog outputs with a range of 0 V to 4.096 V.

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.

USB-1208FS-Plus and USB-USB-1408FS-Plus: Both devices offer two 12-bit analog outputs with a range of 0 V to 5 V.

When updating continuously from computer memory (hardware-paced mode), the analog outputs update at a maximum rate of 50 kS/s per channel.

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.

USB-1208FS-Plus and USB-1408FS-Plus: Port B0 through Port B7 are high-current drive (24 mA) digital I/O connections.

Event Counter Input

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

MCC DAQ Software

Each device ships with the MCC DAQ software CD, which includes InstaCal, a software utility for installing, calibrating, and testing Measurement Computing hardware, along with the following software packages:

TracerDAQ

TracerDAQ is an out-of-the-box application that can generate, acquire, analyze, display, and export data within seconds of installing Measurement Computing data acquisition hardware. TracerDAQ includes a strip chart, an oscilloscope, a function generator, and a rate generator, all of which are accessed through a common, easy-to-use interface.

TracerDAQ provides four virtual instrument applications used to graphically display and store input data.

Universal Library

The Universal Library (UL) is a set of programming libraries for developing applications with Visual Studio programming languages (and others) for use with Measurement Computing hardware. UL includes a complete function library that simplifies the configuration and operation of your measurement device. UL supports Visual Studio and Visual Studio .NET, and includes 64-bit driver support for Windows 8, 7 and Vista.

ULx for NI LabVIEW

ULx for NI LabVIEW is a comprehensive library of graphical functions and example programs comprising all the power of the Universal Library. ULx for NI LabVIEW is compatible with NI LabVIEW 8.5 and later, and allows quick development of NI LabVIEW instrumentation, acquisition, and control applications with Measurement Computing hardware.

Software Available Separately

DAQFlex (USB-1208FS-Plus/1408FS-Plus Only)

For DAQ programming in virtually any OS – including Linux and Mac platforms – the DAQFlex framework combines a small footprint driver with a message-based command protocol. The simplicity of the driver is enabled with a message-based protocol that offers an efficient yet powerful interface to DAQ devices and a common command set that simplifies application development.

TracerDAQ Pro

TracerDAQ Pro is available as a purchased upgrade to TracerDAQ. TracerDAQ Pro supports more active channels, more samples per channel, and a selection of options and enhancements designed to address many test and measurement applications.

DASYLab

Customers needing more performance than TracerDAQ Pro provides can purchase DASYLab, an icon-based data acquisition, graphics, control, and analysis software package. DASYLab offers real-time analysis and control, and provides the ability to create custom graphical user interfaces without programming.

Compared to other graphical programming environments, DASYLab has a very short user-learning curve. Many applications can be configured in a few minutes, rather than days or weeks.
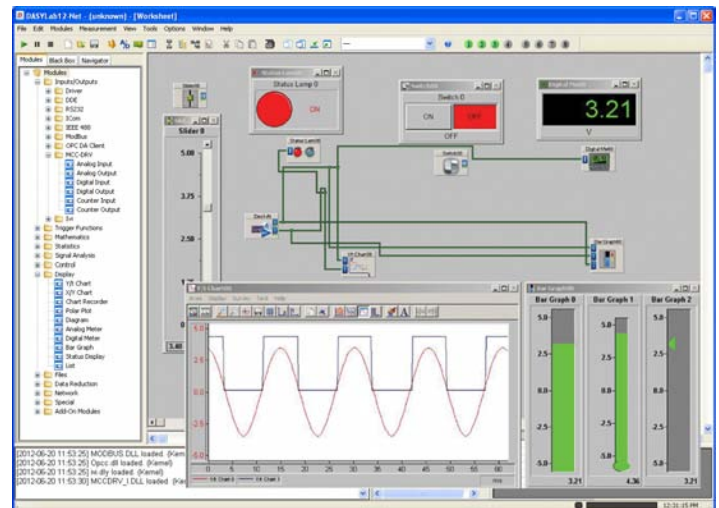
DASYLab gives users the ability to create applications by simply dragging-and-dropping functional icons on a worksheet, connecting the icons together, and running the program. DASYLab supports most MCC data acquisition hardware.

The USB-1208LS/1208FS/1408FS are also supported by the MATLAB Data Acquisition Toolbox.

Specifications

General

Environment
    Operating Temperature: 0 ˚C to 70 ˚C
    Storage Temperature: –40 ˚C to 70 °C
    Relative Humidity: 0% to 90% non-condensing
Communications
    USB-1208LS: USB 1.1 low-speed mode (1.5 Mbps)
    USB-1208FS/1208FS-Plus/1408FS/1408FS-Plus: USB 2.0 full-speed mode (12 Mbps)
Acquisition Data Buffer (USB-1208LS Only): 4 kS
Signal I/O Connector: 2 banks of screw-terminal blocks
Dimensions (L × W × H)**:** 79 × 82 × 27 mm (3.10 × 3.20 × 1.05 in.)

Analog Input

A/D Converter Type: Successive approximation
Channels: 8 SE or 4 DIFF, programmable as SE or DIFF
Input Common-Mode Voltage Range for Linear Operation
    SE Mode: CHx to GND, ±10 V max
    DIFF Mode: CHx to GND, –10 V min, 20 V max
Absolute Maximum Input Voltage
    USB-1208LS: CHx to GND,±40 V max
    USB-1208FS/1208FS-Plus/1408FS/1408FS-Plus: CHx to GND, ±28 V max
Input Impedance: 122 kΩ
Input Current
    Input current is a function of applied voltage on the analog input channels. For a given input voltage, V_{in}, the input leakage is approximately equal to $(8.181 * V_{in} – 12)$ µA
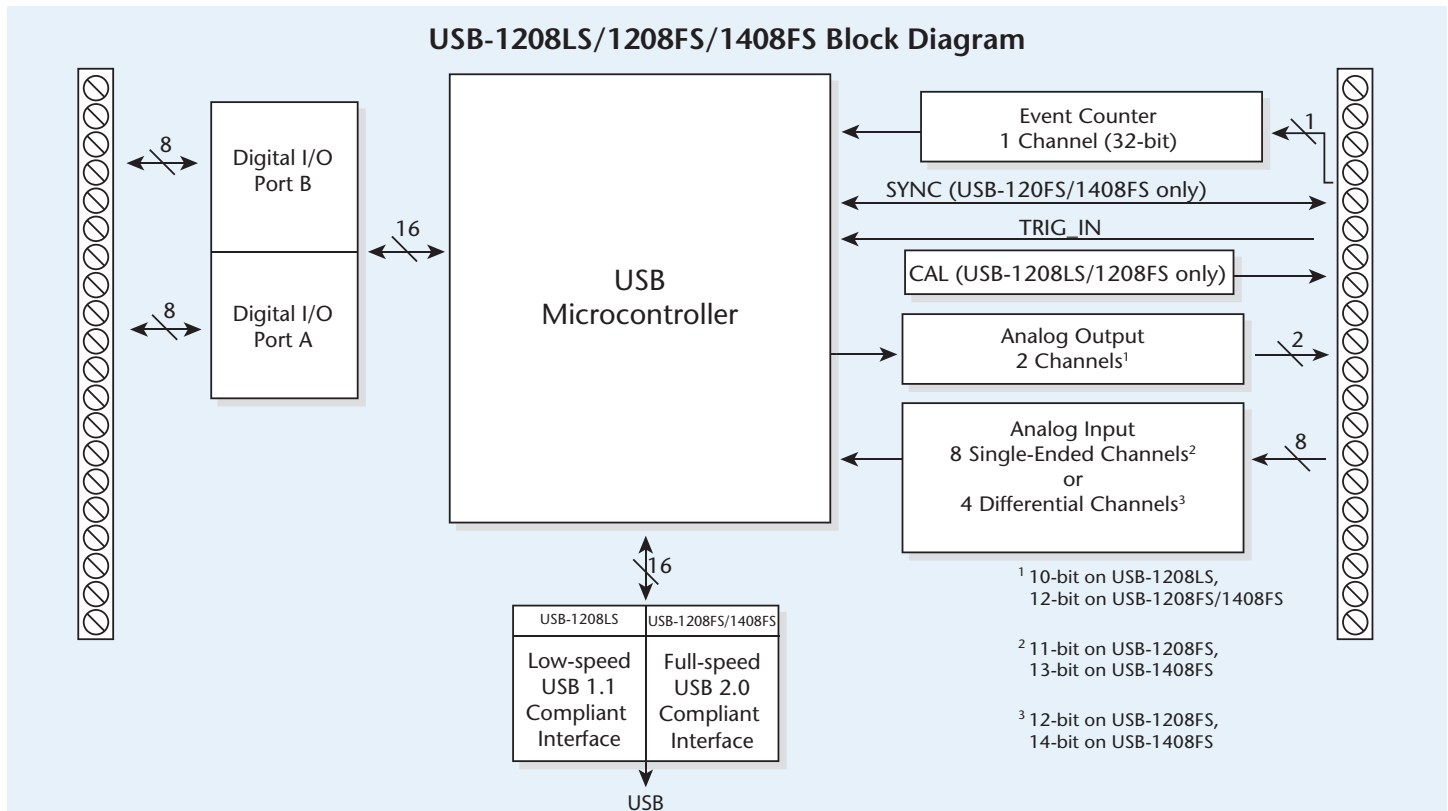 V_{in} = 10 V, 70 µA typ
    V_{in} = 0 V, –12 µA typ
    V_{in} = –10 V, –94 µA typ
Ranges: Software or selectable on a per-channel basis
    SE Mode: ±10 V
    DIFF Mode: ±20 V, ±10 V, ±5 V, ±4 V, ±2.5 V, ±2.0 V, ±1.25 V, ±1.0 V

USB-1208LS/1208FS/1408FS Block Diagram

Throughput

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

USB-1208LS

Software Paced: 50 S/s typ, system-dependent

Hardware Paced: 1.2 kS/s

Burst Scan to 4 kS FIFO: 8 kS/s

USB-1208FS/1208FS-Plus

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

Hardware Paced: 50 kS/s

USB-1408FS/1408FS-Plus

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

Hardware Paced: 48 kS/s

Channel Gain Queue

USB-1208LS/1208FS-Plus/1408FS-Plus: Up to 8 elements, software-selectable channel and range

USB-1208FS/1408FS: Up to 16 elements, software-selectable channel and range

Resolution

USB-1208LS/1208FS/1208FS-Plus

DIFF: 12 bits, no missing codes

SE: 11 bits (the AD7870 converter only returns 11-bits (0–2047 codes) in SE mode)

USB-1408FS/1408FS-Plus

DIFF: 14 bits, no missing codes

SE: 13 bits (the AD7871 converter only returns 13-bits (0–8192 codes) in SE mode)

CAL Accuracy

USB-1208LS: CAL = 2.5 V, ±0.05% typ, ±0.25% max

USB-1208FS: CAL = 2.5 V, ±36.25 mV max

Integral Linearity Error

USB-1208LS/1208FS/1208FS-Plus: ±1 least significant bit (LSB) typ

USB-1408FS/1408FS-Plus: ±2 LSB typ

Differential Linearity Error: ±0.5 LSB typ

Repeatability: ±1 LSB typ

CAL Current (USB-1208LS/1208FS Only)

Source: 5 mA max

Sink

USB-1208LS: 20 µA min, 200 nA typ

USB-1208FS: 20 µA min, 100 µA typ

Absolute Accuracy Long Term Drift (USB-1408FS/1408FS-Plus Only)

Extrapolating the long term drift accuracy specifications provides the approximate long term drift of the USB-1408FS intermediate input ranges.

±20 V Range: ±3 LSB typ (Δt = 1000 hrs)

±4 V Range: ±6 LSB typ (Δt = 1000 hrs)

±1 V Range: ±8 LSB typ (Δt = 1000 hrs)

2.5VREF Accuracy (USB-1408FS Only)

±36.25 mV max

2.5VREF Output Current (USB-1408FS/1408FS-Plus Only)

Source: 5 mA max

Sink: 20 µA min, 100 µA typ

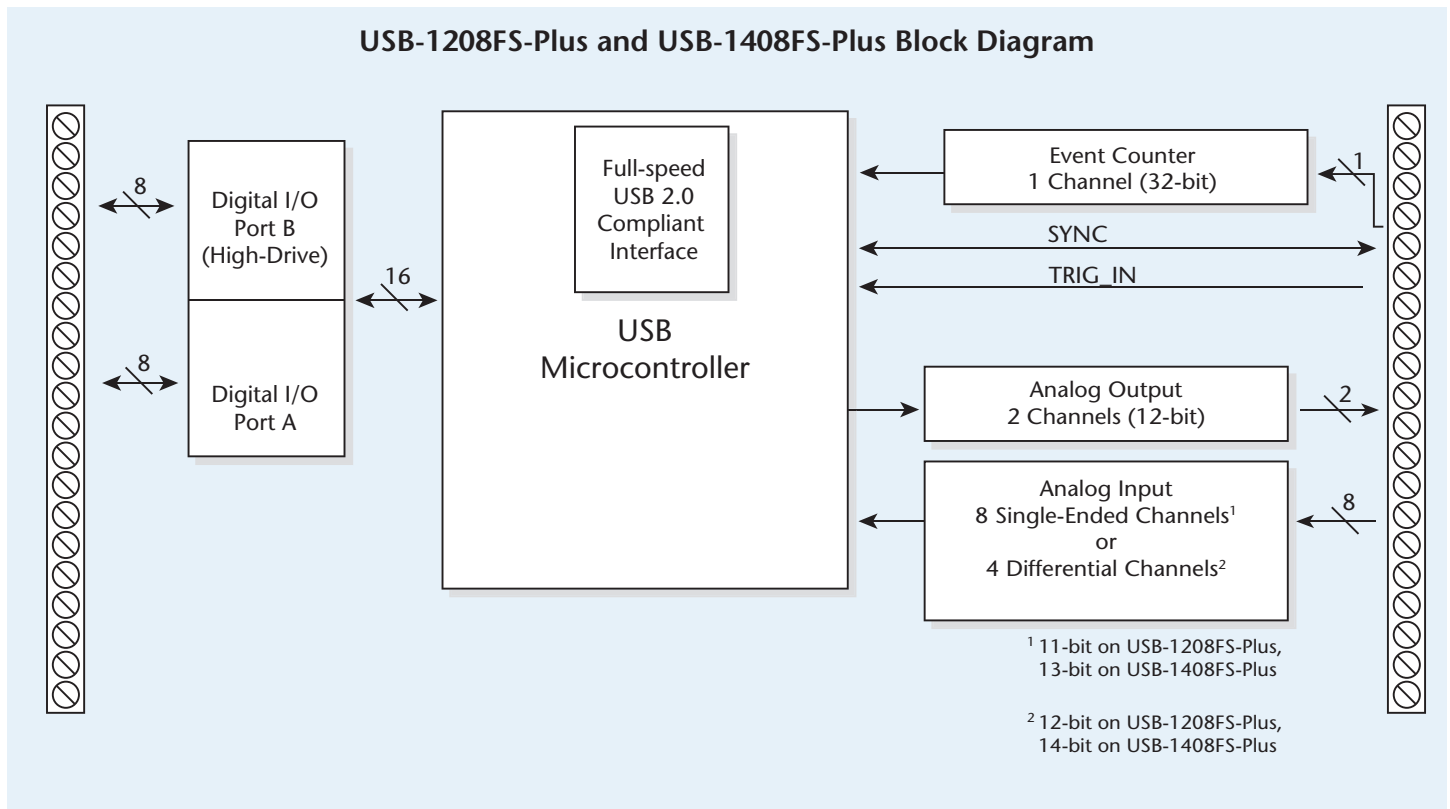**Trigger Source (Software-Selectable)**

External Digital: TRIG_IN

Clock Source (All Devices Except USB-1208LS, Software-Selectable)

Internal

External (SYNC), Rising Edge Triggered

USB-1208FS-Plus and USB-1408FS-Plus Block Diagram

[1] 11-bit on USB-1208FS-Plus, 13-bit on USB-1408FS-Plus

[2] 12-bit on USB-1208FS-Plus, 14-bit on USB-1408FS-Plus

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

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

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

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

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

Analog Output

Resolution
USB-1208LS: 10 bits, 1 in 1024
USB-1208FS/1208FS-Plus/1408FS/1408FS-Plus: 12 bits, 1 in 4096
Output Range
USB-1208LS/1208FS-Plus/1408FS-Plus: 0 V to 5 V
USB-1208FS/1408FS: 0 V to 4.096 V, 1 mV per LSB.
Number of Channels: 2
Throughput
Maximum throughput scanning to computer memory depends on the computer being used.
USB-1208LS
   Software Paced
      Single Channel: 100 S/s
      Dual channel, simultaneous update: 50 S/s
USB-1208FS/1208FS-Plus/1408FS/1408FS-Plus
   Software Paced: 250 S/s single channel typ, system-dependent
   Hardware Paced
      USB-1208FS/1408FS
         Single Channel: 10 kS/s
         Dual Channel: 5 kS/s
      USB-1208FS-Plus/1408FS-Plus: 50 kS/s max per channel
Power On and Reset Voltage
USB-1208LS/1208FS/1208FS-Plus: Initializes to 000h code
USB-1408FS/1408FS-Plus: 0 V, ±20 mV typ, initializes to 000h code
Maximum Voltage (USB-1208LS Only)
Vs is the USB +5 V power. The maximum analog output voltage is equal to Vs at no load. V is system-dependent and may be less than 5 V.
   No Load: Vs
   1 mA Load: 0.99 * Vs
   5 mA Load: 0.98 * Vs
Output Drive (Each D/A OUT)
USB-1208LS: 30 mA
USB-1208FS and USB-1408FS 15 mA
USB-1208FS-Plus and USB-1408FS-Plus: 5 mA, sourcing
Slew Rate
USB-1208LS: 0.14 V/ms typ
USB-1208FS/1208FS-Plus/1408FS/1408FS-Plus: 0.8 V/µs typ
Accuracy (All Values are ±) (All Devices Except USB-1208LS)
USB-1208FS/1408FS
   0 V to 4.096 V: 4.0 LSB typ, 45.0 LSB max
USB-1208FS-Plus/1408FS-Plus
   0 V to 5 V: 4.0 LSB typ, 45.0 LSB max (accuracy tested at no load)

Analog Output Accuracy Components (All Values are ±)
(All Devices Except USB-1208LS)
    USB-1208FS/1408FS
        Range: 0 V to 4.096 V
    USB-1208FS-Plus/1408FS-Plus
        Range: 0 V to 5 V
    % of FSR: 0.1 typ, 0.9 max
    Gain Error at Full Scale: 4.0 mV typ, 36.0 mV max
    Offset:[1] 1.0 mV typ, 9.0 mV max
    Accuracy at FS: 4.0 mV typ, 45.0 mV max

Digital I/O

Digital Type
    USB-1208LS: 82C55
    All Other Devices: CMOS
Number of I/O: 16 (Port A0 through A7, Port B0 through B7)
Configuration
    2 banks of 8
    USB-1208FS-Plus/1408FS-Plus: Port B is high-current drive
Pull Up/Pull-Down Configuration: All pins pulled up to 5 V through 47 kΩ resistors (default).
    All Devices Except USB-1208LS: Change to pull-down using internal user-configurable jumpers.[2]
    USB-1208LS: Positions available for pull-down to ground. Hardware-selectable through 0 Ω resistors as a factory option.
Input High Voltage: 2.0 V min, 5.5 V absolute max
Input Low Voltage: 0.8 V max, –0.5 V absolute min, 0 V recommended min
USB-1208LS
    Output High Voltage (IOH = –2.5 mA): 3.0 V min
    Output Low Voltage (IOL = 2.5 mA): 0.4 V max
USB-1208FS/1408FS
    Output High Voltage (IOH = –6.0 mA): 3.84 V min
    Output Low Voltage (IOL = 6.0 mA): 0.33 V max
USB-1208FS-Plus/1408FS-Plus
    Output High Voltage, Port A: 4.4 V min (IOH = –20 µA), 3.84 V min (IOH = –6.0 mA)
    Output Low Voltage, Port A: 0.1 V max (IOL = 20 µA), 0.33 V max (IOL = 6.0 mA)
    Output High Voltage, Port B: 4.4 V min (IOH = –50 µA), 3.76 V min (IOH = –24.0 mA)
    Output Low Voltage, Port B: 0.1 V max (IOH = 50 µA), 0.44 V max (IOH = 24.0 mA)
Power On and Reset State: Input

External Trigger

Trigger Source: External digital, TRIG_IN
    USB-1208LS: Schmitt trigger input protected with a 1.5 kΩ series resistor)
Trigger Mode
    USB-1208LS: Level sensitive; software-selectable for TTL level high or low input
    All Other Devices: Edge sensitive; software-selectable for CMOS-compatible rising or falling edge
Trigger Latency
    USB-1208LS: Burst, 25 µs min, 50 µs max
    All Other Devices: 10 µs max
Trigger Pulse Width
    USB-1208LS: Burst, 40 µs min
    All Other Devices: 1 µs min

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1. **USB-1208FS-Plus/1408FS/1408FS-Plus:** Zero-scale offsets may result in a fixed zero-scale error producing a *dead-band* digital input code region. In this case, changes in digital input code of less than 0x040 may not produce a corresponding change in the output voltage. The offset error is tested and specified at code 0x040.
   USB-1208FS: Negative offsets result in a fixed zero-scale error or *dead-band*. At the maximum offset of –9 mV, any input code of less than 0x009 does not produce a response in the output.
2. **USB-1208FS** hardware revisions D and later, and **USB-1408FS h**ardware with part number 193331*x* (where x is the revision letter) can be changed to pull-down using an internal jumper. Other revisions/part numbers can be configured at the factory for pull-down.

USB-1208LS
    Input High Voltage: 3.0 V min, 15.0 V absolute max
    Input Low Voltage: 0.8 V max
    Input Leakage Current: ±1.0 µA
All Other Devices
    Input Type: Schmitt trigger, 47 kΩ pull-down to ground
    Schmitt Trigger Hysteresis: 1.01 V typ, 0.6 V min, 1.5 V max
    Input High Voltage Threshold: 2.43 V typ, 1.9 V min, 3.1 V max
    Input High Voltage Limit: 5.5 V absolute max
    Input Low Voltage Threshold: 1.42 V typ, 1.0 V min, 2.0 V max
    Input Low Voltage Limit: –0.5 V absolute min, 0 V recommended min

External Clock Input/Output (All Devices Except USB-1208LS)

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
    USB-1208FS/1208FS-Plus: 50 kHz, max
    USB-1408FS/1408FS-Plus: 48 kHz, max
Clock Pulse Width
    Input Mode: 1 µs min
    Output Mode: 5 µs min
Input Type: Schmitt trigger, 47 kΩ pull-down to ground
Schmitt Trigger Hysteresis: 1.01 V typ, 0.6 V min, 1.5 V max
Input High Voltage Threshold: 2.43 V typ, 1.9 V min, 3.1 V max
Input High Voltage Limit: 5.5 V absolute max
Input Low Voltage Threshold: 1.42 V typ, 1.0 V min, 2.0 V max
Input Low Voltage Limit: –0.5 V absolute min, 0 V recommended min
Output High Voltage: 4.4 V min (IOH = –50 µA), 3.80 V min (IOH = –8 mA)
Output Low Voltage: 0.1 V max (IOL = 50 µA), 0.44 V max (IOL = 8 mA)

Counter

Pin name: CTR
Counter Type: Event counter
Number of Channels: 1
Input Type
    USB-1208LS: TTL, rising edge triggered
    USB-1208FS/1408FS: 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
USB-1208LS
    Schmidt Trigger Hysteresis 20 mV to 100 mV
    Input Leakage Current: ±1 µA
    Input High Voltage: 4.0 V min, 5.5 V absolute max
    Input Low Voltage: 1.0 V max, –0.5 V absolute min
All Other Devices
    Schmidt Trigger Hysteresis: 1.01 V typ, 0.6 V min, 1.5 V max
    Input High Voltage Threshold: 2.43 V typ, 1.9 V min, 3.1 V max
    Input High Voltage Limit: 5.5 V absolute max
    Input Low Voltage Threshold: 1.42 V typ, 1.0 V min, 2.0 V max
    Input Low Voltage Limit: –0.5 V absolute min, 0 V recommended min

Non-Volatile Memory

USB-1208LS

Memory Size: 8192 bytes

Memory Configuration

Address 0x0000 to 0x17FF: Read/write access, A/D data (4 kS)

Address 0x1800 to 0x1EFF: Read/write access, user data area

Address 0x1F00 to 0x1FEF: Read/write access, calibration data

Address 0x1FF0 to 0x1FFF: Read/write access, system data

USB-1208FS/1408FS

EEPROM: 1,024 bytes

EEPROM Configuration

USB-1208FS

Address 0x000 to 0x07F: Reserved access, 128 bytes system data

Address 0x080 to 0x1FF: Read/write access, 384 bytes calibration data

Address 0x200 to 0x3FF: Read/write access, 512 bytes user area

USB-1408FS

Address 0x000 to 0x1FF: Read/write, access 512 bytes user area

Address 0x200 to 0x3FF: Read/write access, 512 bytes calibration data

USB-1208FS-Plus/1408FS-Plus

EEPROM: 2,048 bytes (768 bytes calibration, 256 bytes user, 1,024 bytes DAQFlex)

Power[3]

USB-1208LS

Supply Current: 20 mA (total current requirement; includes up to 5 mA for the status LED)

5 V USB Power Available

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

Connected to Bus-powered Hub: 4.1 V min, 5.25 V 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: 450 mA min, 500 mA max

Connected to Bus-powered Hub: 50 mA min, 100 mA max

USB-1208FS/1408FS

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

5 V USB Power Available

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

Connected to Bus-powered Hub: 4.1 V min, 5.25 V 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

USB-1208FS-Plus/1408FS-Plus

Supply Current

During USB Enumeration: < 100 mA

After USB Enumeration, Including DIO, AO, SYNC, and +VO Output Loading: < 500 mA

+VO Power Available After USB Enumeration: 4.5 V min, 5.25 V max

+VO Output Current After USB Enumeration: 100 mA max

Ordering Information

Description	Part No.
USB-based DAQ device with eight 12-bit analog inputs, 1.2 kS/s, two analog outputs, and 16 digital I/O lines	USB-1208LS
USB-based DAQ device with eight analog inputs, 50 kS/s, up to 12-bit resolution, two D/A outputs, and 16 digital I/O lines.	USB-1208FS
USB-based DAQ device with eight analog inputs, 50 kS/s, up to 12-bit resolution, two D/A outputs, 16 digital I/O lines (includes eight high-current lines) and DAQFlex support.	USB-1208FS-Plus
USB-based DAQ device with eight analog inputs, 48 kS/s, up to 14-bit resolution, two analog outputs, and 16 digital I/O lines.	USB-1408FS
USB-based DAQ device with eight analog inputs, 48 kS/s, up to 14-bit resolution, two analog outputs, 16 digital I/O lines (includes eight high-current lines) and DAQFlex support.	USB-1408FS-Plus

Software

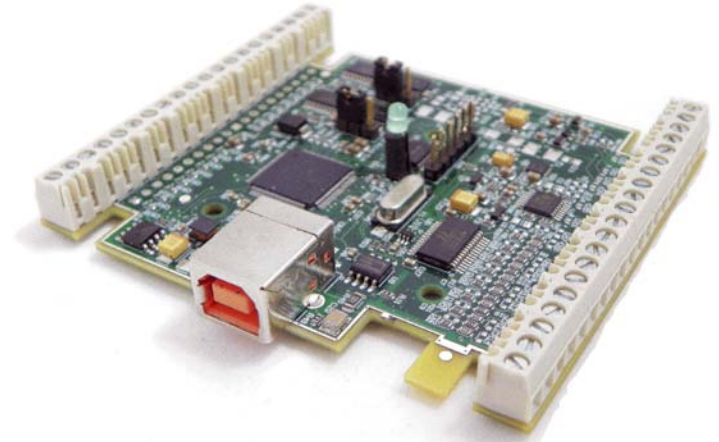|	
Icon-based data acquisition, graphics, control, and analysis software	DASYLab
Out-of-the-box virtual instrument suite with strip chart, oscilloscope, function generator, and rate generator – professional version	TracerDAQ Pro

OEM Board-Only Versions Also Available

USB-1208FS/LS/1408FS Series devices are also available in board-only form factors for OEM and embedded applications.

All devices can be customized to meet customer needs.

A USB-1408FS is shown here with the case removed.

Contact Measurement Computing for OEM/custom versions.

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3 Self-powered USB hubs and hosts have their own power supply. The USB port(s) on your computer are root port hubs. All externally powered root port hubs (desktop computers) provide up to 500 mA of current for a USB device. Battery-powered root port hubs provide 100 mA or 500 mA, depending upon the manufacturer. A laptop PC that is not connected to an external power adapter is an example of a battery-powered root port hub.

Bus-powered USB hubs and hosts do not have their own power supply.