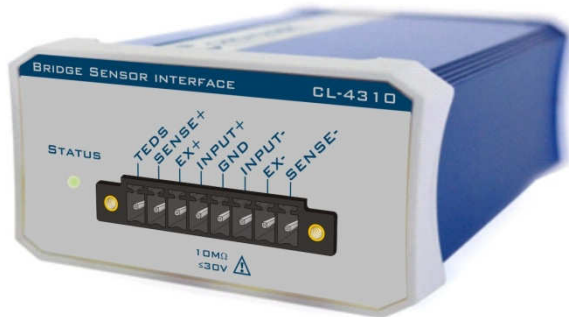


## ChronoLogic CL4310 – 18 bit Digitiser with Bridge Sensor interface

- 1 MSPS sample rate
- Fully Isolated input
- Strain Gauge / Differential analog input
- Continuous Time anti aliasing filter
- 95 dB Dynamic range
- Built-In Excitation with sense
- Clipping and Excitation fault Detection
- $\pm 1$  mV to  $\pm 10$ V input Range
- Built-In Shunt Calibration
- IEEE 1451.4 Class 2 TEDS support
- LabVIEW™ Drivers and IVI Programming API
- Supplied with FREE ChronoLogic Control Center
- Over 100 channels  
(synchronized with USB-inSync™)



Distributed Virtual Instrument

## Overview

The Distributed Virtual Instrument (DVI) product range provides users with the ultimate in test & measurement flexibility. Each DVI is a standalone unit that provides a specific functionality in a small, rugged form factor with all of the plug-and-play benefits of USB. In addition, DVI's can be combined and used as building blocks to create large, synchronous test setups consisting over more than 100 devices with multiple functionalities. ChronoLogic's Maestro – Master Timing Hub further ensures nanosecond phase accuracy of all measurements and clocks.

The CL4310 Digitizer with Bridge Sensor interface can be combined with any other member of the ChronoLogic DVI or USB-inSync™ family to create a truly expandable virtual instrument. The device has been designed for applications where data integrity and reliability is of great importance. It has clipping detection throughout the analogue signal path and indicates excitation voltage errors. Clipped signals or excitation errors are marked in the signal stream for easy indication. The device is built using top rated components and each unit undergoes extensive test and verification procedures prior to shipment.

The CL4310 offers outstanding flexibility and can be interfaced with a broad range of bridge and strain gauge sensors or can just used as a precise analogue differential input device. It features a programmable fully symmetrical excitation voltage with remote sense capability, a wide input range from  $\pm 1$  mV to  $\pm 10$  V, a continuous time 8-order anti aliasing filter, and a digital filter programmable in the range from 10 Hz to 100 kHz. It also includes a 128 MB onboard memory for measurements requiring extended data captures. The compact plug-and-play form factor and rugged aluminium enclosure makes the DVI Bridge Sensor Interface ideal for portable, bench top, and OEM applications. ChronoLogic's free Control Centre Software provides an interactive interface with the ability to combine different functionality into one virtual device.

### Software (included)

- ChronoLogic Control Centre Soft Front Panel
- Multi-Channel Scope and FFT Analyser
- Support for NI LabVIEW / IVI Programming API
- Support for Windows XP / Vista / Windows 7

## Detailed Product Specifications

The CL4310 is a universal 1 MSPS digitizer which can be used either as a differential analog input or together with resistive accelerometers, pressure sensors, or strain gauge sensors. It supports full- and half-bridge sensors but can easily be connected to quarter bridge sensors by using external bridge completion resistors. The device provides a fully symmetrical excitation power supply with two sense lines to compensate for losses in long sensor cables. The CL4310 provides a clipping detection in the analog signal path which marks clipped signals in the acquired signal. This feature indicates clipped signals even if they have been removed by the anti aliasing filter and are not visible in the digitized signal. The high sampling rate together with 18-bit vertical resolution results in a detailed signal, suitable for additional signal processing. The high speed USB interface has enough bandwidth to stream real time data to the host computer for instant signal assessment. The ChronoLogic DVI family is designed to combine modules with different functionality to build application specific measurement setups. For example, you can combine 3 analog input channels for IEPE sensors, one input channel for bridge sensors, one digital input for trigger events, and one analog output to generate arbitrary waveform patterns. Connecting the devices using one of our USB Master-HUBs via standard USB cables and hubs ensures nanosecond phase accuracy. All devices will be automatically synchronized to less than one nano second – without using any trigger connections between the devices. ChronoLogic's Control Centre software combines the functionality of all devices in one virtual software interface so all connected units appear as one multi-functional device. Advanced users can implement the functionality in LabView or using our IVI programming API.

### Typical data at 25°C if not otherwise noted

#### Acquisition System

Number of channels: 1  
 Vertical resolution: 18 bits  
 Input ranges:

Input Range	Min Signal Bandwidth*	Zero Trim Range
±0.4 mV**	150kHz	±5 mV
±1 mV	200 kHz	±5 mV
±2 mV	200 kHz	±25 mV
±5 mV	200kHz	±25 mV
±10 mV	350 kHz	±25 mV
±20 mV	350 kHz	±25 mV
±50 mV	350 kHz	±25 mV
±100 mV	350 kHz	±25 mV
±200 mV	350 kHz	±250 mV
±500 mV	350 kHz	±250 mV
±1 V	350 kHz	±250 mV
±2 V	350 kHz	±250 mV
±5 V	350 kHz	±250 mV
±10 V	200 kHz	±250 mV

\*) Aliasing and FIR filter bypassed, otherwise limited to max 120 KHz

\*\*\*) This range cannot be calibrated by self-calibration

Common mode Range: ±6 V  
 Common mode rejection: > 80 dB @ 10 kHz  
 Zero Voltage Trim Range: see table  
 Maximum Data Rate: 1 MSPS  
 Onboard sample memory: 128 MB (~43 million samples)  
 Input impedance (Typ): 100 GΩ || 220 pF  
 Maximum input overload: ±30V peak  
 Input coupling: DC

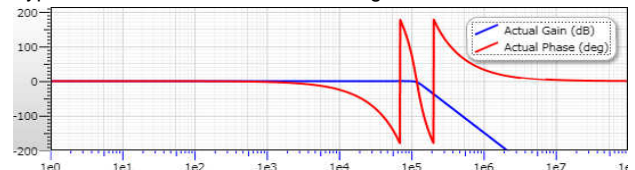
#### Bridge Completion

Internal Bridge Completion: ½ Bridge  
 Bridge Completion Resistors: 5.49 kΩ  
 Resistor Tolerance Ratio: 0.1%  
 Resistor Tracking TC: 10ppm/°C  
 Bridge completion terminal: Negative Signal input

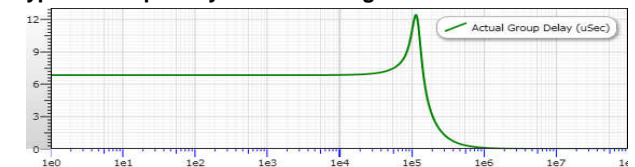
#### Anti Aliasing Filter

Filter Type: Continuous time filter  
 Characteristic: 8-pole Butterworth  
 Corner Frequency (fc): 100 kHz  
 Aliasing suppression: >100 dB @ 500 kHz

Typical Gain and Phase of anti aliasing filter:



Typical Group Delay of anti aliasing filter:



#### Digital Filter

Filter Type: FIR  
 Corner Frequency (fc): 10 Hz to 100kHz, OFF (programmable)

#### Excitation Voltage

Excitation	Transducer Voltage	Maximum Current
±1.25 V	2.5V	50 mA
±2.5 V	5V	50 mA
±5 V	10V	50 mA
User specific*	0V to 10V programmable	50 mA

\*) User specific values are not factory calibrated

Excitation Type: Constant differential voltage  
 Tolerance: < ±0.05%  
 Excitation Current: 50 mA max  
 Remote Sense: Positive and Negative  
 Impedance of Remote Sense: ~ 100 MΩ || 100 nF (Bridge completion and shunt resistors off)  
 Excitation Noise: TBA  
 Short circuit protection: EX to GND and between EX+ and EX-

**Shunt Calibration Switch**

Resistance of Switch: min 33 Ω, max 37 Ω  
Shunt modes: Open, CAL+, CAL-

**DC Performance**

Gain Error: ±0.05 %FSR  
Offset Error: ±0.05 %FSR

**AC Performance**

Dynamic Range: 95 dB @ FSR  
Oversampled dynamic Range: 129 dB @ 1 kSPS  
Signal-to-Noise: TBA  
Spurious-Free Dynamic Range: TBA  
THD: TBA

**Signal Integrity**

Excitation fault indication: I<sub>EX</sub> > 50 mA  
Clipping detection: Analogue Signal Path  
Clipping/Fault Identification: Clipped Measurements are marked in data stream

**Dallas 1W TEDS**

Standard: IEEE 1451.4, Class 2  
Functionality: Read unique ID Number  
EEPROM access: R/W Access (Optional)

**ID-Module TEDS**

Supported Module Type: Kistler, Endevco  
Functionality: Read Content (Up-to 2048 Bytes)  
Access Modes: Autonomic Mode (Optional)  
Direct Mode (Optional)  
Shunt Calibration

**Time base System**

Sampling clock frequency: 1 MHz  
Jitter: 15 ps RMS  
Time base accuracy: ±50 ppm, 1 ns across modules using Maestro MTH

**Trigger System**

Modes: Edge, glitch, pulse, software, LF rejection, RF rejection  
Sources: Analog, other DVI devices, software  
Slope: Rising or falling

**Power Requirements (typical)**

USB +5V DC: 690 mA max  
External power: 12 V/ 320 mA max  
External power connector: DIN 45323 (2 mm pin)  
Switchover USB/External: Automatically

**Isolation**

Maximum isolation Voltage: 250 V DC  
Isolation resistance: > 10 MΩ  
Coupling capacitance: ~ 40 nF

**Warning: Isolation is not designed nor approved to withstand life threatening voltages!**

**Firmware Updates**

Firmware updates and Software options can be installed any time via USB download.

**Analogue Input Connector**

Lockable Plug (included): MC 1,5/ 8-STF-3,5  
Cable Housing (included): KGG-MC 1,5/ 8  
Manufacturer: Phoenix Contact

**Mechanical**

Enclosure: Aluminium  
Dimensions (L x W x H): 130 x 68 x 34 mm  
Weight: 250 gram

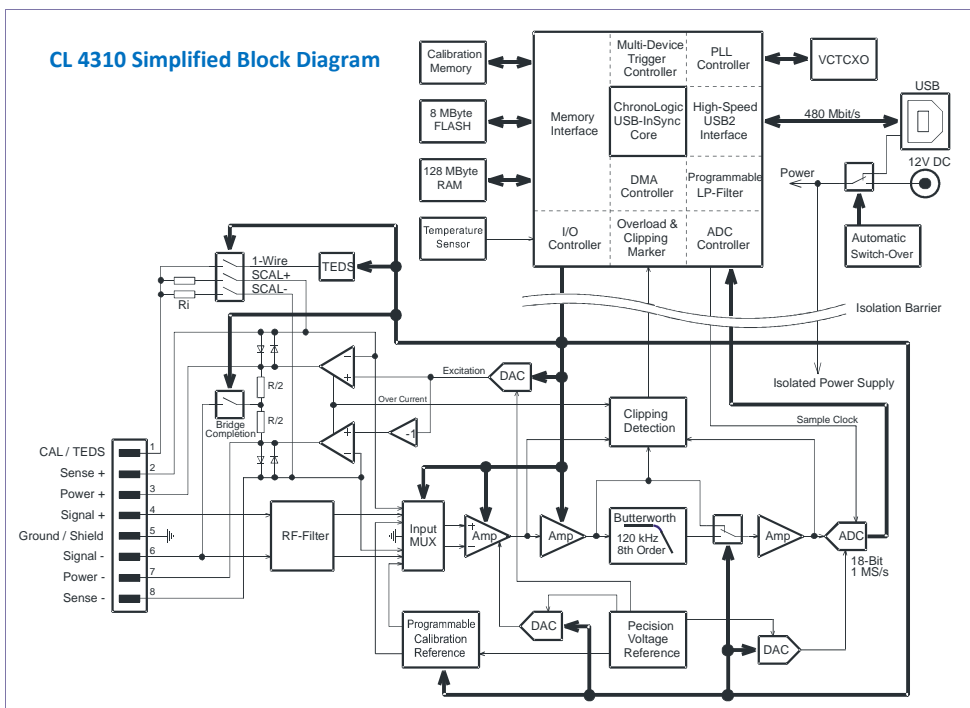
**Environment**

Operating temperature: 0 to 45 °C  
Storage temperature: -20 to 70 °C  
Relative humidity: 10 to 90%, non condensing

**Calibration**

Self-Calibration: Offset, gain, time base  
External calibration: 1 year  
Internal voltage reference drift: 50 ppm/1000 h

**Certifications currently pending**





USB-inSync™ is a revolutionary technology which adds highly accurate timing and synchronization to the already powerful Universal Serial Bus (USB). While preserving all the features of USB, the enhanced capability of USB-inSync™ enables new applications and solutions never before possible. USB-inSync™ has transformed the fundamental properties of USB and opened up a new range of possibilities. USB-inSync™ will become the solution of choice for PC I/O applications where portability, expandability, synchronous performance, and cost are significant considerations.

ChronoLogic's USB-inSync™ specification defines a rugged PC-based I/O platform for test, measurement and automation systems. USB-inSync™ builds upon the USB specification that has become the preferred connectivity standard for portable, office and home computer environments. USB-inSync™ is an extension to USB that combines the widespread inter-compatibility features of USB with the advanced timing and software features required for an industrial PC I/O communication platform. These advances open up a new world of possibilities in the development of synchronized systems for distributed test and measurement, data acquisition, automation and manufacturing applications.

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