

## ChronoLogic CL4320 – 18 bit Digitiser with IEPE Transducer Interface

- 1 MSPS sample rate
- Fully Isolated input
- IEPE compliant input / Analog Input
- 8-Order Continuous Time Filter
- 95 dB Dynamic range
- Clipping and Cable Break Detection
- $\pm 2$  mV to  $\pm 10$ V input Range
- AC or DC Coupling
- IEEE 1451.4 Class 1 TEDS support
- LabVIEW™ Drivers
- IVI Programming API included
- 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 CL4320 Digitizer with IEPE Transducer 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 at great importance. It has clipping detection throughout the analogue signal path as well as cable break detection. Clipped signals are marked in the signal stream for easy indication. The device is build using top rated components and each unit undergoes extensive test and verification procedures prior to shipment.

The CL4320 offers outstanding flexibility and can be interfaced with a broad range of sensors or can just be used as a precise analogue input device. It features a switchable IEPE (ICP) compliant constant current source programmable from 2mA to 8mA, a wide input range from  $\pm 2$  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 features 128 MB onboard memory for measurements requiring extended data captures. Alternatively, measurements can be streamed via its High-Speed USB interface continuously.

The compact plug-and-play form factor and rugged aluminium enclosure makes the DVI IEPE Transducer 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.

The CL4320 DVI is supplied with ChronoLogic's Control Center software, complete with a simple to use Graphical User Interface (GUI). Also provided is ChronoLogic's sophisticated scope and FFT analyser software which combines multiple devices in one user interface. For advanced users, access to extended low-level device functionality is available through our IVI programming API. This enables interfacing through Windows based software application including MS Office, Visual Studio and National Instruments LabVIEW™. Additional LabVIEW™ device drivers are available so that USB-inSync™ devices can be quickly implemented within an existing test environment.

#### 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 CL4320 is a universal 1 MSPS digitizer which can be used either as a single ended analog input or together with any IEPE compliant transducer. Its highly flexible sensor interface makes the CL4320 an ideal choice for a wide range of applications. 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 Transducers, one input channel for bridge sensors, one digital input for trigger events, and one analog output to generate arbitrary waveform patterns. All this is done just by connecting the devices to our USB Master-HUB via standard USB cables. 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 any other programming software using IVI programming API. This flexibility makes the system an ideal choice for application where the functionality needs to be frequently adapted to meet new requirements.

Typical data at 25°C if not otherwise noted

### Acquisition System

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

Input Range	Min Signal Bandwidth*	Applicable Input Settings
±2 mV	50 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±5 mV	50 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±10 mV	350 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±20 mV	350 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±50 mV	350 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±100 mV	500 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±200 mV	500 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±500 mV	1 MHz	AC, DC, 1MΩ, 100GΩ, IEPE
±1 V	1 MHz	AC, DC, 1MΩ, 100GΩ, IEPE
±2 V	350 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±5 V	350 kHz	AC, DC, 1MΩ, 100GΩ, IEPE
±10 V	200 kHz	AC, DC, 1MΩ, 100GΩ, IEPE

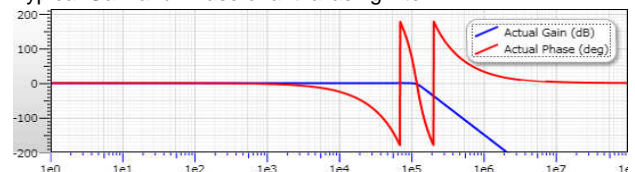
\*) Aliasing filter bypassed, otherwise limited to max 120 KHz

Maximum Data Rate: 1 MSPS  
 Onboard sample memory: 128 MB (~43 million samples)  
 Input impedance (switchable): 1 MΩ || 1 nF or >100 GΩ || 1 nF  
 Maximum input overload: ±20V peak (IEPE switched off)  
 Input coupling: AC, DC  
 AC coupling cut-off frequency: 0.16 Hz (-3 dB)

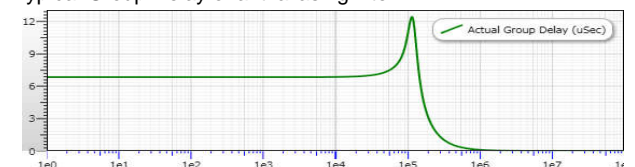
### Anti Aliasing Filter

Filter Type: Continuous time filter  
 Characteristic: 8-pole Butterworth  
 Corner Frequency (fc): 120 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)

### IEPE Power supply

Output Voltage: 24 V DC  
 Constant current: OFF, 2, 4, 6, and 8 mA (programmable)  
 Current source impedance: > 300 kΩ @ 100 KHz  
 Current Noise: TBA

### 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 (FIR filter set to 1kHz)  
 Signal-to-Noise: TBA  
 Spurious-Free Dynamic Range: TBA  
 THD: TBA

**Signal Integrity**

Broken wire detection: Open circuit indication  
Clipping detection: Analogue Signal Path  
Clipping Identification: Clipped Measurements are marked in data stream

**Dallas 1W TEDS**

Standard: IEEE 1451.4, Class 1  
Functionality: Read unique ID Number  
EEPROM access: R/W Access (Optional)

**Time base System**

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

**Trigger System**

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

**Power Requirements (typical)**

USB +5V DC: 700 mA with IEPE power  
500 mA w/o IEPE power  
External power: 12 V/ 350 mA max  
External power connector: DIN 45323 (2 mm pin)  
Switchover USB/External: Automatically

**Isolation**

Maximum isolation Voltage: 250 V DC  
Isolation resistance: > 20 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**

Connector type: BNC

**Mechanical**

Enclosure: Aluminium  
Dimensions (L x W x H): 130 x 68 x 34 mm  
Weight: 210 gram

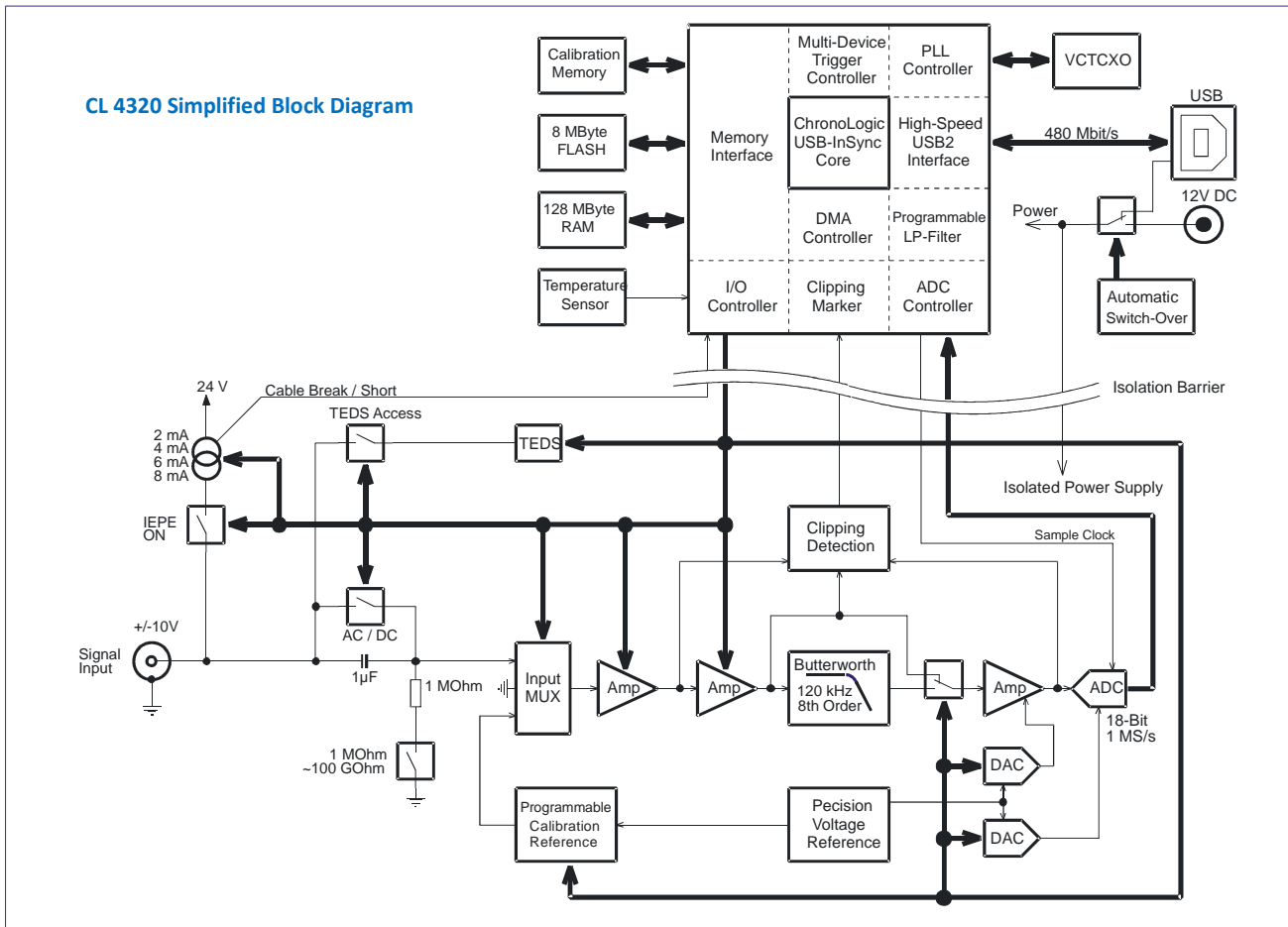
**Environment**

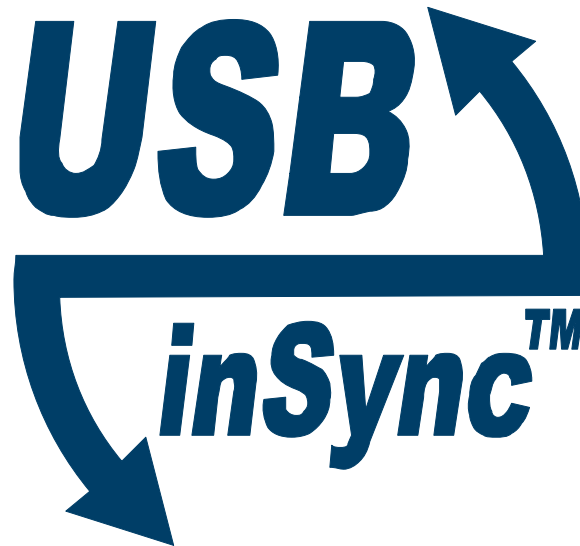
Operating temperature: 0 to 45 °C  
Storage temperature: -20 to 70 °C  
Relative humidity: 10 to 90%, non condensing

**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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