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Digitizer AL81004C

- 4 analog input channels
- AC/DC coupling, software selectable
- 50 Ohm input impedance/high input impedance, software selectable individually for each channel
- Full-scale input ranges:
20 mVp-p-2Vp-p in steps of 0.2 dB
- Fine offset control, +- 500 mV
- Time profile for gain control, 20 ns resolution, 8 bit gain control DAC

Bandwidth: DC to 80 MHz - 3 dB
Input Coupling: AC or DC, software selectable

AL81004C

(also referred to as AL4108) is a four channel A/D board for the PCI bus and both PCI 32-bit and PCI 64-bit bus compliant. It is optimized for high-speed transient capture at a sampling rate of 100 MSamples/sec at very high repetition rates. A large dual ported onboard buffer memory allows simultaneous transient recording and readout of captured data. A post-processing section can be used to extract peak information on multiple gates while the captured data is transferred over the PCI bus into the PC main memory.

The analog inputs are AC or DC-coupled and terminated with 50 Ohms or 50 impedance for high signal fidelity over the entire analog bandwidth of 80 MHz. Input voltage ranges are programmable from 20mVp-p to 2Vp-p.

Four A/D converters with 8 bits resolution sample the input signal at 100 MSsamples/sec. The sampled data is stored in an onboard memory buffer of 32 Msamples per channel. The size of this buffer memory determines the maximum length of an acquisition. The board will be ready to accept a trigger about 2 microseconds after the end of the previous acquisition, which allows for repetition rates well beyond 100 kHz for short acquisitions.

The sampling clock is generated on the board and not available externally. Lower sampling rates of 50, 33.33, 25, down to (100/256) MSamples/sec are created by decimating the sampled data while reading it from the buffer memory. Reading data from the buffer memory occurs simultaneously with acquisition and does not affect repetition rate.

The sampled data is transferred over the PCI bus using DMA, thus requiring no CPU intervention to achieve high transfer rates. During this data transfer, a set of peak detectors can be used to monitor the sample stream and extract peak position and threshold crossing data over selected pieces of the sampled data.

A large selection of flexible triggering modes allows the user to tailor the behavior of the board to many applications. In addition to the standard software-generated trigger, the board can be triggered by a threshold crossing of the analog input signal on any channel or a signal fed to the BNC Trigger connector, a digital TTL signal on the internal trigger connector or a position-derived trigger from an encoder or motor of a scanning system.

The BNC Trigger connector can also drive a trigger signal as an output; for instance, to fire an ultrasonic pulser/receiver. This driver supports special modes that can be used to trigger multiple boards simultaneously from any of the connected boards, simply by tying the BNC Trigger connectors together.

A simple oscilloscope program is included with the board. It allows evaluation of the various configurations and triggering modes of this board. Drivers and a DLL implementing OKOS Solutions' software provide easy access to the functionality of the board from a user application.

The internal sampling clock is generated by a PLL, multiplying a 5 MHz reference up to 400 MHz. From an external source the sampling clock can either be fed in directly from an external 400 MHz source or multiplied up by the PLL from an external 10 or 5 MHz reference input. In either case the sampling will be coherent with the external input clock. Many other reference input frequencies are possible – any multiple of 500 KHz from 5 to 50 MHz.

A/D Converter

- 8 bits resolution
- 100 MSamples/sec sampling rate on four channels, 200 MSamples/sec on two channels or 400 MSamples/sec on one channel

Clock

- Sampling rates: 400, 200, 100, 50, 25MHz, 12.5MHz, 6.35MHz & more down to 781KHz with intenal clock
- External clock options: direct supply of clock or 10 or 5 MHz reference clock
- Input impedance: 50 Ohms
- Reference output for frequency-locking of multiple boards: 5MHz, TTL

Trigger Sources

- Software trigger
- Internal trigger connector, TTL, programmable polarity (3 pin header)
- External trigger input (BNC trigger connector), programmable threshold -5.0V .. +5.0V and polarity, 50 Ohm / 1 kOhm input impedance software selectable
- Signal threshold trigger, programmable threshold and polarity Encoder position trigger, for scanning applications

Physical Dimensions

- Full height, half length PCI board (176mm x 100mm)

Trigger Output

TTL output, 2V into 50 or 25 Ohms

programmable polarity

pulse indicates beginning and end of acquisition

Acquisition Control

Pre-trigger and Post-trigger delay acquisition

28 bit pre/post-trigger and length counters

Auto re-arming

Interrupt after programmable number of acquisitions

Streaming mode for direct acquisition into PC memory at 100 MBytes/sec

Memory

Dual-ported on-board acquisition memory: 32 MSamples * 4 channels at 100 MSamples/sec, 64 MSamples * 2 channels at 200 MSamples/sec or 128 MSamples * 1 channel at 400 MSamples/sec

Fast offload while acquiring

Optimized for maximum repetition rate in both pre- and post-trigger modes

DSP Functions

Multiple acquisitions per trigger

On-board peak detection with up to 100 gates

Customized processing functions available through firmware upload

Bus Interface

PCI interface, 64 bits, 66 MHz (also works in 32 bit, 33 MHz slots)

PCI master mode operation

DMA transfers with scatter/gather support

Interrupt on completion of DMA transfers

Connectors

4 SMB connectors for analog signal inputs

BNC connector for clock/reference input/output

BNC connector for trigger input/output

16 bit digital TTL I/O, can be used for up to four position encoders

Internal trigger I/O connector, TTL (3 pin header)

PCI interface card-edge connector (64 bit)

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