Transfert de technologies et savoir faire – Knowledge & Technology Transfer

LICENSING / COLLABORATION OPPORTUNITY

USB Wave Catcher: a USB-powered 12-bit 500-MHz 3.2-GSample/s digitizer

References

IN2P3: jjmmssnn (rempli par le gestionnaire au siege)
Patents: D. Breton, E. Delagnes, **Echantillonneur analogique rapide à grande profondeur mémoire.** French patent n° **01 05607** from April 26th 2001. US Patent **6,859,375** from February 22nd 2005**: Fast analog sampler with great memory depth**.

Description

The USB WAVE CATCHER board is suited for acquisition over a short time window of fast analog signals. It is USB 2.0 driven at a 12Mbits/s rate and its very low power consumption (< 2.5W) allows it to be powered by the sole USB bus.

It performs the digitization over 256 points of 2 DC-coupled analog channels of bandwidth above 500MHz over 12 bits at a sampling frequency (Fe) switchable between 400MHz, 800MHz, 1.6GHz and 3.2GHz. It also includes on each channel a pulse generator for reflectometry measurements and the possibility to perform signal charge integration (direct measurement of the charge of a PM signal for instance). In the latter case, the sustainable trigger rate can rise up to a few tens of kHz.

The input analog ranges can be individually offset thanks to 16-bit DACs over the full ±1.25V dynamic range, thus taking benefit of the maximum SNR whichever the shape of the signal.

The trigger signals can be generated inside the board (there is an individual discriminator with a 16-bit DAC threshold on each input, internal random trigger) or outside (software trigger, external trigger input). The board trigger can also be sent to the external world through the LVCMOS trigger output. So, different boards can easily be synchronized. Moreover, trigger rate counters are implemented, thus permitting to measure said rates independently of the readout of the event.

Power is taken from USB, but the board can also be powered with a +5V external supply through a standard 2.1mm jack plug. Although the standard default connectors are BNC, SMA or LEMO connectors can be mounted instead.

The board is packaged inside a white ergonomic plastic box. The board status is continuously displayed thanks to 6 LEDs located on the top face.

Technology and/or Application Domain(s)

Fast digitizers, USB acquisition boards

Keywords :

Digitizer, digitization, USB, acquisition, low power, picosecond, time measurement

Figure 1: *the USB Wave Catcher*

State of development / Innovative aspects and main advantages

The board is commercially available.
An oscilloscope-like software is also available.
Software is plug&play (Windows) and USB power makes it very convenient to use.

Fields of application / Potential commercial applications

The USB-WaveCatcher can advantageously replace oscilloscopes for a much lower cost in applications where a high-precision is needed on fast signals over a short-window. Moreover, it can be used for very high precision time measurements, especially since said measurements can be performed directly on the analog signals. Said signals can be present either on the same input channel, or on two different channels. Sampling time precision is better than 10 ps rms at 3.2GS/s.

Offering: Licensing / Collaboration :

Licensing

Contact in Laboratory

Main inventor: *Dominique Breton*
Tel: +33 (1) 64 46 83 30
email: breton@lal.in2p3.fr

Technology Transfer Officer: *Véronique Puill*
Tel: +33 (1) 64 46 84 23
email: puill@lal.in2p3.fr

Contact IN2P3 – Head of Technology Transfer Office

Marcel Soberman
Tel: +33 (0) 1 4496 4318
email: partenariat.industriel@in2p3.fr
http://valorisation.in2p3.fr/