Technical Datasheet
UltraScope USB

DaseL sistemas

Revision:	8
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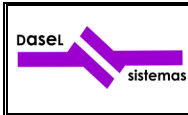
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1 CHANNELS

The UltraScope USB system has 1 UT channel with 2 connectors, to use the system in pulse-echo mode, emitting and receiving for the same connector (connector 1) or in the transmission mode using one connector for emission (connector 1) and using the other one for reception (connector 2).
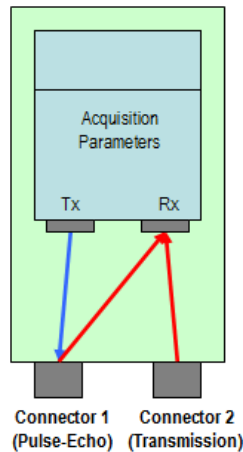

Fig 1.- External UT connectors.

Channels:	
1 UT channel with two acquisition modes: - Pulse-echo mode - Transmission mode	

2 PULSER

Pulser:	Negative square wave pulse	
Pulse amplitude	Programmable -20 V to -400 V	
Pulse width	Programmable from 40 ns to 2 µs, with resolution of 6.25 ns	
Fall Time	< 10 ns.	
Rise Time	< 20 ns.	
Pulse repetition frequency (PRF)	Up to 10 kHz	
Burst mode	Up to 64 consecutive pulses	
Damping	400 Ω.	

3 RECEIVER

Amplifier:	Wide-band and low-noise amplifier	
Gain	Programmable from 0 dB to 80 dB	
TGC	Arbitrary Time-Gain-Compensation curve (512 points)	
Bandwidth (-3 dB)	0.3 MHz to 30 MHz	
Equivalent input noise	1 nV/$\sqrt{Hz}$ (equivalent to 5.5 μVef in the bandwidth)	
Input protection circuit	Low resistance MOSFET active circuit	
Maximum input signal	1.4 Vpp	
Input impedance	1.6 KΩ	

Sampling (A/D Conversor):	Differential input A/D converters with LVDS output	
Resolution	10 bits	
Sampling frequency	Programmable from 5 MHz to 80 MHz	

Acquisition modes:	Pulse-echo, transmission and dual (bi-crystal)	
Automatic start of the acquisition with programmable threshold (echo-start)		
Alarm detected in safe mode (user manual mode)	When the user is scanning manually, the system guarantees that all A-Scan signals that cause an alarm (gates 1 or 2) are shown in screen.	

Acquisition depth	- Programmable up to 6.400 µs, with 100 ns of resolution (2200 mm steel, longitudinal waves in pulse-echo) - Programmable up to 1.600 µs, with 25 ns of resolution (550 mm steel, longitudinal waves in pulse-echo)	
Start Delay (Inhibition Time)	- Programmable up to 6.400 µs, with 100 ns of resolution - Programmable up to 1.600 µs, with 25 ns of resolution	
Attenuator	Programmable 0 dB / - 20 dB	
Channel Cross-Talk	< -60 dB	

4 FILTERS

Filters	
Anti-aliasing Low-Pass Filter (30 MHz)	
Band-Pass Digital Filter (see section 6)	

5 TRIGGER MODES

Trigger modes	
Software Trigger	
Internal PRF	
Encoder Trigger	
Encoder Trigger (Positive pulse 2.5 V .. 5V - Minimum width: 100 ns)	

6 SIGNAL PROCESSING

Signal processing	Real-time signal processing of acquired scan lines (Hardware Implemented)	
Band-Pass filter with programmable cutoff frequencies 63 coefficients FIR implementation. - Constant response in the pass band (ripple < 0.1 dB) - High attenuation in the stop band (typ. > -50 dB)		
Signed 10 bits format data		
Acquisition information data in real-time: A-scan, B-scan, peak position and amplitude (gates), encoders count		
2 hardware gates for the peak detection (Independent or linked): - gate type → Detection of the maximum or the minimum. - start / end gate → Programmable 0 µs to 6.400 µs, with 100 ns of resolution. - start / end gate → Programmable 0 µs to 1.600 µs, with 25 ns of resolution. - threshold gate → Programmable (0 to 100 % screen)		(1)
Scan compression with Non-Peak-Loss compression algorithm, up to 128:1 compression rate.		
Programmable down-sampling factor from 1 to 16 (equivalent sampling frequencies between 5 MHz and 80 MHz)		
Digital Envelope detection.		
EMI Filter - *Removes, in real-time, the impulsive noise* - *Improves flaw detection and reduces the production of false alarms* - *Keeps a high dynamic range in noisy environments for C and D-scans*		(2)
Average (Up to 32 signals)		(3)
Auto-calibration of the A/D conversor offset		(3)
Auto-calibration of the optimum data compression factor		(3)

(1) When the gates are linked, the start time of the gate 2 depends on the peak detected by the gate 1.
(2) Hardware processing
(3) Software processing when the trigger source is internal by software.

7 CONTROL SIGNALS

Control signals	Trigger sources and I/O signals	
Encoder inputs	2 quadrature encoder inputs	
Input-Output	External trigger input, sync output	

8 TIME-GAIN COMPENSATION (TGC)

Time-Gain-Compensation function (TGC)		
Gain range	48 dB	
Time range	Up to 820 µs depending on timing resolution	
Time resolution	Programmable 100 ns a 1.6 µs, with resolution of 100 ns	
Number of TGC points	Programmable up to 512	

9 OTHER SPECIFICATIONS

Power consumption	900 mA (5 V) Maximum, loaded 50 Ω, PRF=10 KHz, pulse amplitude -400 V.	
Power supply	100- 220 V 47- 63 Hz , Fuse 2 A.	
Dimensions	150 x 106 x 38 mm	
Weight	0.45 Kg	
Temperature range	0 ºC to 50 ºC (Ambient)	
Operative system	Microsoft Windows 7 / VISTA / XP / 2000 / 98SE de 32 bits	
Interface	USB 2.0 480 – MBITS/s	
Internal memory	1 MB (512 KSamples)	

10 SOFTWARE

DASEL provides the "*UltraView*" application to configure all the acquisition parameters, as well to show, save and load the A-Scan signals acquired by the system. This application also allows getting B-Scan and C-Scan images triggering with an encoder or an external signal.

All the data acquired with the "*UltraView* " application can be loaded from MatLab, to make a post processing.

DASEL also provides a programming library to operate the system from MatLab, LabView, Python, Visual Studio, Borland C++, etc.

This library offers the functions set to configure all the acquisition parameters, and get the acquisition data.

The "*UltraView* " application and the programming library are available to run in Windows 32/64 bits 7 / VISTA / XP / 2000 / 98SE.