

Ultrascope USB

Main features



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1 Version control

Document Review	Update
1 13/08/2009	Initial documentation.

2 PULSER

Pulser:	Negative, square wave.	
Pulse amplitude	Programmable from -20 to -400 V	
Pulse width	[STD] → Programmable from 40 ns to 1 μs, with resolution 6.25 ns [LF] → Programmable from 40 ns to 20 μs, with resolution 25 ns	(1)
Falling Time	< 10 ns.	
Rising Time	< 20 ns.	
Rep. rate (PRF)	To 10 kHz	
Burst mode	Programmable, from 1 to 16 pulses	
Damping	400 Ω.	

(1) [STD]: Standard system. [LF]: Low frequency system (AIR)

3 RECEIVER

Amplifier:	Low noise amplifier and wide bandwidth	
Gain	Programmable from 0 to 80 dB	
DAC	Integrated DAC curve, 512 points.	
Bandwidth (-3 dB)	[STD] → 0.3 to 30 MHz (-3 dB) [LF] → 50 KHz to 2.5 MHz (-3 dB)	(1)
Input noise	1 nV/√Hz (5.5 μVef @Bandwidth)	
Protection circuit	Active protection circuit with low impedance MOSFET.	
Maximum input signal	1.4 Vpp	
Input impedance	1.6 KΩ	

(1) [STD]: Standard system. [LF]: Low frequency system (AIR)

Digitizer (A/D Conversor):	A/D conversor with differential input, LVDS output	
Resolution	1 bits	
Sampling frequency	[STD] → Programmable from 5 MHz to 80 MHz [LF] → Programmable from 1.25 MHz to 20 MHz	(1)

(1) [STD]: Standard system. [LF]: Low frequency system (AIR)

Acquisition mode:	Pulse-echo, through transmission and dual (bi-cristal)	
Automatic acquisition start with programmable signal level		

Range	- Programmable to 6.400 μs, with 100 ns resolution. - Programmable to 1.600 μs, with 25 ns resolution	
Zero offset	- Programmable to 6.400 μs, with 100 ns resolution - Programmable to 1.600 μs, with 25 ns resolution	
Linearity	± 1 dB	
Atenuattor	Programmable 0 dB / - 20 dB	
Cross-talk	< -60 dB	

4 FILTER

Filter		
[STD] → Anti-aliasing low-pass filter at 30 MHz (bandwidth: 0.3 to 30 MHz, @-3 dB). [LF] → Anti-aliasing low-pass filter at 3 MHz (bandwidth: 0.05 to 3 MHz, @-3 dB).		(1)
Digital pass-band filter (see section 6)		

(1) [STD]: Standard system. [LF]: Low frequency system (AIR)

5 TRIGGER SOURCES

Trigger sources	
Software internal	
PRF internal	
Encoder	
External Trigger	

6 DIGITAL SIGNAL PROCESSING

Digital signal processing	Post-processing functions in real time.	
63 tap digital pass-band FIR filter. Arbitrarily chosen low-pass and high-pass frequencies (f_c) within the bandwidth.		
$\frac{f_s}{62} \leq f_c \leq \frac{f_s}{2}$		
<ul style="list-style-type: none"> - High flatness (ripple < 0.1 dB) in the pass-band, small transition band - High attenuation out of the pass-band (typ. > 50 dB) 		
Data format: 10 bits with sign		
Information registry: A-scan, gates, peaks, encodersz position in real time.		
2 programmables gates to peaks detection (single or linked) <ul style="list-style-type: none"> - Alarm threshold → maximum / minimum - Initial / end time: <ul style="list-style-type: none"> → Programmable to 6.400 μs, with 100 ns resolution → Programmable to 1.600 μs, with 25 ns resolution - Threshold → Programmable (0 to 100 % of scale) 		(1)
Data compression: ratios from 1:1 (no compression) to 128:1, without loss of peak amplitude and position information.		
Programmable decimation from 1 to 16 (sampling frequency from 5 MHz to 80 MHz)		
Digital envelope detección (VIDEO output)		
EMI-noise reject filter		(2)
Averaging (to 32 acquisitions)		(3)
A/D conversors offset auto-calibration		(3)
Optimum data compression auto-calibration		(3)

(1) When the gates are linked, second gate start time depends on the first gate position peak.

(2) Hardware processing

(3) Software processing

7 CONTROL SIGNALS

Control signals	I/O signals	
Encoders	2 inputs, cuadrature encoders	
Input / Output	External Trigger, Sync output	

8 ATENUATTION COMPENSATION

Distance – Atenuattion compensation curve (DAC):		
Gain range	48 dB	
Time span	To 820 μ s	
Resolution	Programmable from 100 ns to 1.6 μ s, in 100 ns steps	
Points number	Programmable to 512	
Points intervals	Programmable from 0.1 to 1.6 μ s, int 100 ns steps.	

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9 MISCELLANEOUS

Consume	Maximum 900 mA (5 V), 50 Ω load, PRF=10 KHz, -400 V pulse amplitude.	
Power	100- 220 Volt 47- 63 Hz , Fuse 2 A.	
Dimensions	150 x 106 x 38 mm	
Weight	0.45 Kg	
Operating temperature range	0 °C a 50 °C	
Operating system	Microsoft Windows VISTA / XP / 2000 / 98SE	
Interfaz	USB 2.0 480 – MBITS/s	
Internal memory	1 MB (512 KSamples)	