



1 / 2 Full 1-ch ultrasound electronic.

## 1-Ch System with 1:8 Multiplexer

Fraunhofer Institute for  
**Biomedical Engineering IBMT**  
Prof. Dr. Heiko Zimmermann

Main Department Ultrasound  
Dipl.-Ing. Steffen Tretbar  
Joseph-von-Fraunhofer-Weg 1  
66280 Sulzbach  
Germany

### Contact

M.Eng. Christoph Risser  
Electronics Engineering  
Main Department Ultrasound  
Telephone +49 6897 9071-360  
christoph.risser@ibmt.fraunhofer.de

[www.ibmt.fraunhofer.de](http://www.ibmt.fraunhofer.de)  
[www.ultrasound.fraunhofer.de](http://www.ultrasound.fraunhofer.de)

### System description

This single-channel ultrasonic system has been specially developed for industrial applications. The focus of development is on cost optimization while ensuring high performance, reliability and flexibility. Up to eight individual measuring paths can be controlled by the system via an integrated multiplexer. The used ZYNQ-7 chip, which combines the advantages of an FPGA with those of a microcontroller, takes over the entire sequence control of the system, the transmission signal generation, the receive-end data management as well as the administration of the communication interfaces. The data processing can be done completely on the integrated chip, so that only the final calculated measurement value is transferred to the user. But it is also possible to transmit the acquired ultrasound data via a fast USB 3.0 interface to a terminal device, whereupon the data analysis can be performed.

The system properties listed in the table are for orientation only. On request, the device can be adapted to individual requirements.

### Standard specifications

#### Transmitter TX

<i>Channels:</i>	1
<i>Transmit voltage:</i>	+/- 100 V (adjustable)
<i>Transmit current:</i>	2.5 A max.
<i>Signals:</i>	Tri-state burst signals (programmable)
<i>Resolution:</i>	12.6 ns (up to 2 ns possible)

#### Receiver RX

<i>Channels:</i>	2
<i>Noise:</i>	0.75 nV/ $\sqrt{\text{Hz}}$
<i>Amplification:</i>	Max. 55 dB 48 dB adjustable
<i>Sampling frequency:</i>	Up to 125 MSPS
<i>Resolution:</i>	12 bit
<i>Local memory:</i>	BRAM 6 kByte

#### System

<i>Frequency range:</i>	100 kHz – 20 MHz
<i>Input voltage:</i>	12 V (DC)
<i>Power consumption:</i>	Approx. 5 W
<i>FPGA / SoC:</i>	ZYNQ XC7Z010
<i>Signal processing:</i>	Embedded
<i>Data interface:</i>	USB 3.0
<i>Multiplexer:</i>	1:8 (Tx), 4:2 (Rx)
<i>Transducer interface:</i>	8 x SMB
<i>Dimensions:</i>	160 x 130 x 20 mm (without casing)