IBMT

1 *Transmit-Receive Module con-*
nected to a Notebook (USB).
2 *Liner Thickness Measurement*
with TRM.

TRANSMIT-RECEIVE MODULE (TRM)

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System Description

High sampling rates and fast detection times as well as a flexible real-time signal evaluation are the requirements for ultrasonic measurements in real time. TRM is a DSP based single channel ultrasonic measuring system for pulse-echo-operation. The received signals are amplified, digitized and processed with a digital signal processor (DSP).

Typical applications for TRM are ultrasound based level metering, flow measurement, volume and distance metering or material characterization. It is used in many different fields like production lines, power and sewage plants, automotive sensing, environmental control or sonar applications.

Application

Ultrasound based flow and level metering as well as quantitative turbidity detection are flexible and reliable methods for process control in small and big facilities like hydroelectric power plants, sewage plants or production lines. Ultrasound is used for water and gas metering in homes as well as for level metering in tanks or vessels. The detection of flaws or the measurement of the thickness of liners are typical tasks in the quality control of sewer or fresh water pipes. Beyond the long term inspection of working facilities the technology is used for the final acceptance of new or reconstructed systems.
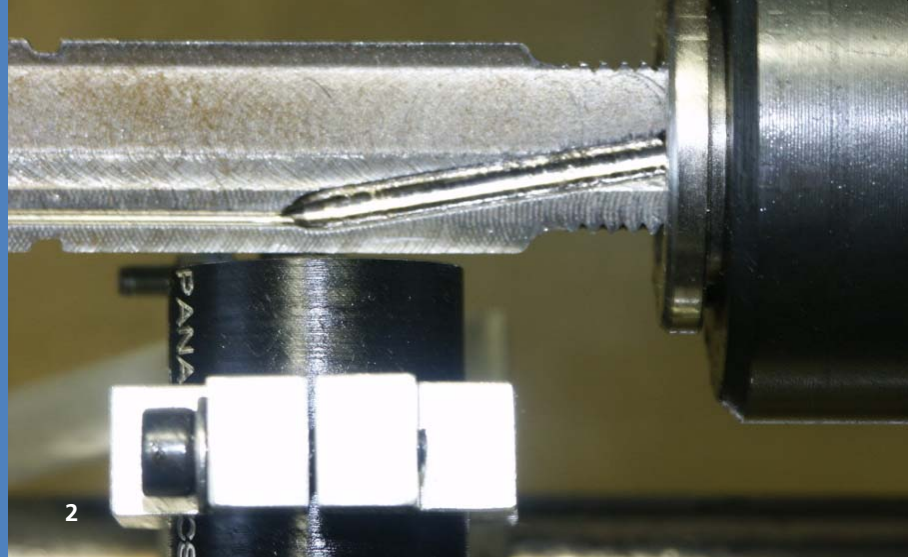
Further Applications

The 100%-control of manufacturing toler-ances of parts or the quality control of laser lenses under operation conditions can be done by the use of appropriate sensors in combination with a fast and powerful hardware like the single channel systems TRM or USS. An integration of these sys-tems in existing quality management sys-tems is possible.

Further applications for ultrasonic based quality control are material characteriza-tions, the measurement of temperatures, the detection of concentrations , bubble detection, the measurement of the thick-ness of layers or films, viscosity control or containments in liquids, e.g. in milk, yogurt or liquid chocolate.

Specifications

Transmitter

Frequency	0 – 25 MHz
Output Voltage	max 90 Vpp (50 Ω)
Memory 1 k – 256 k x 18 bit	
Waveform	bidirectional
Waveshape	programmable

Receiver

input Impedance	adjustable
min. Input Voltage	20 µVpp
Amplifier	max 100 dB
Bandwidth	40 MHz
Standard Filter	adjustable

DSP

Signal Processor	56311 (150 MHz)
Program RAM	32 k x 24 bit
x-Data RAM	48 k x 24 bit
y-data RAM	48 k x 24 bit

Conversion

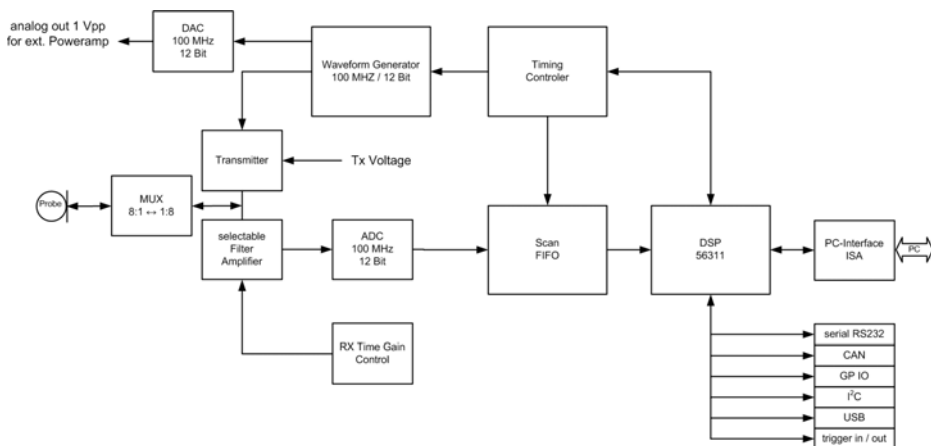|	
ADC	12 bit 100 MSPs
Memory 1 k – 256 k x 18 bit	

Power Consumption

5V: 600 mA; 12 V: 100 mA

Multiplexer

up to 8 channels

Interfaces

ISA (internal PC)
serial RS 232
CAN (V 2.0B)
GP-IO
I2C
USB (with RS232 adaptor)
Trigger in and out
Stand Alone with external Power

1 *Flow-Metering in a Hydroelectric Plant.*

2 *Wall Thickness Measurement.*