OPTIM 2.0 Speed of Sound Measurement Unit
Speed of Sound Measurement Unit

with support for PT1000, NDIR, pressure and other sensors

http://www.optel.eu or www.ultrasonic.technology

OPTIM 2.0 is a very versatile device for precise measurement of **speed of sound** in gases (air, CO2, N, CH4, other gases and mixtures) as well as other gas properties like: temperature, attenuation, pressure, concentration. All in one low power and compact size device.

OPTIM 2.0 is ready for **laboratory**:
fully configurable manual/automatic modes, raw data upload, RF signal inspection
and for **industrial** purpose:
several automatic measurement modes, continuous operation, all measurement results and data from external sensors in one frame.

Features

- Very precise ToF measurement (50ps resolution)
- Wide range of SoS measurement (up to 1000m/s)
- Through transmission mode, 1MHz transducers
- Hardware peak detector for amplitude measurements
- Automatic signal conditioning algorithm
- Several configurable meas. modes
- Advanced raw results processing
- Manual control mode for testing
- Store up to 100 settings sets
- Self-hardware diagnostic
- Easy to use ASCII protocol over RS232
- RF signal output for diagnostic
- Two channels for PT1000 RTD
- Two channels for NDIR sensors
- Support for external sensors or signals (4-20mA, 0-5V)
- Compact size and low power (1W typ.)
- Can be used with various chamber sizes

Applications

- Speed of Sound measurements in gases (laboratory, industrial)
- Gas quality measurements
- Ultrasound attenuation measurements

Open for developments (on request)

- For different transducers (nominal frequency, size)
- Open communication protocol (special commands, procedures)
- Available with USB interface (virtual COM)
- Support for easy firmware update
- Support for other external sensors
- Integration with other systems

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Technical data

General	
Dimensions (WxHxD)	185 x 35 x 109 [mm] box 185 x 40 x 136 [mm] with wall mounting adapters
Weight	490g
Mounting option	Free box, wall mounting, DIN rail clips
Power supply	5.0 [V DC], 4.5 – 5.5 [V DC]
Current consumption	Typ. 200mA (max. 500mA)
Speed of Sound measurement	
Measurement principle	Time of Flight measurement
SoS range	100...1000 [m/s]
ToF modes of operation	1st reflection, 1st to 2nd reflection, dual; Peak (level) or zero-cross comparator mode
ToF resolution	100 [ps]
Distance range	10 to 80 [mm], programmable as parameter
Pulser	
Type	Single positive pulse, short circuit step pulser
Pulse amplitude	up to 360 [V] (no load), 256 steps
Fall time	<40 [ns]
PRF	Typ. 750 [Hz], up to 1500 [Hz]
Receiver	
Total gain range	100 [dB]
Adjustable gain range	0 to 80 [dB], 0.1dB step
Center frequency	1.0 [MHz]
Bandwidth (-3dB)	700 to 1400 [kHz]
PT1000 channels (Ch1, Ch2)	
Measurement principle	Resistance ratio measurement (R-C discharge time measurements, on-board reference resistor)
Connection	2- or 3-wire
Processing	Programmable averaging, offset and gain coefficient
Resolution	0.001 [°C]
NDIR channels (Ch1, Ch2)	
Supported type	Dynament (Premier series)
Interface	RS232, 3.3V signaling
Power supply	On-board switchable 3.3V regulator, up to 300mA (for both channels)
Analog input	
Resolution	11-bit
Current mode	
Sense resistance	270 [Ohm]
Range	0 to 22 [mA]
Voltage mode	
Input resistance	100 [kOhm] (minimum)
Range	0 to 6.0 [V]
Processing	Offset correction, scaling coefficient, averaging
Connectors	
Power & RS232	M8, 5-pin, female, B-coded
Diagnostic	M8, 3-pin, female, A-coded
Analog input	M8, 4-pin, female, A-coded
Transducer (Input, Output)	BNC socket
PT1000 (Ch1, Ch2)	M8, 3-pin, female, A-coded
NDIR (Ch1, Ch2)	M8, 4-pin, female, A-coded