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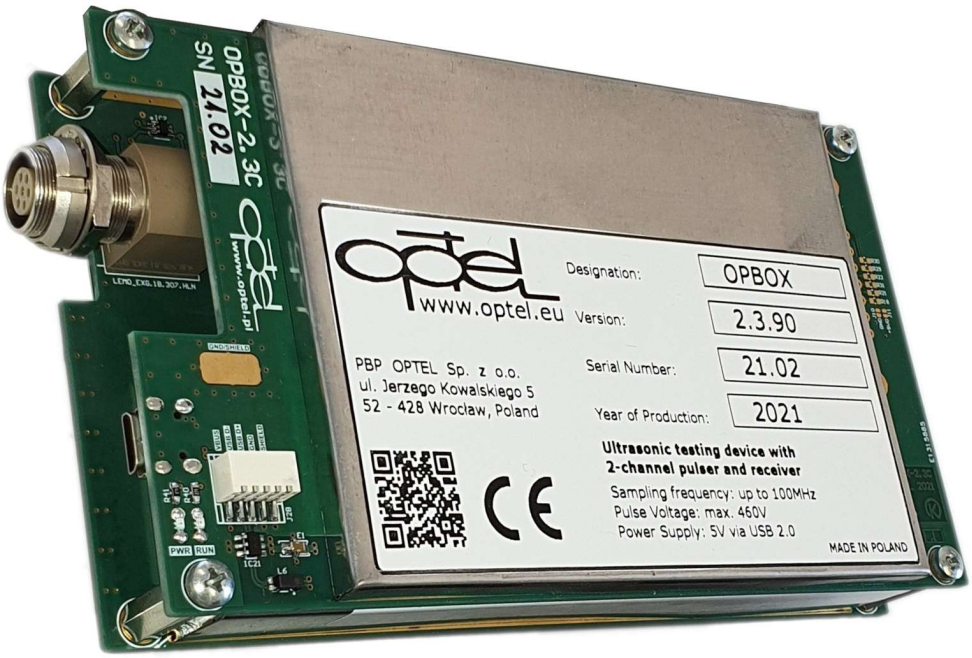
OEM opBox ver 2.3

OEM USB Ultrasonic device with integrated 2-channel pulser&receiver

Overview



Valid for hardware version: 2.3.90

Document version: 1v3
Last changes: 2021-07-06

SpecificationElectrical specification

Parameter of analog receiver:	
Adjustable amplifier:	-31dB to 65dB (step 0.5dB)
Switchable pre-amplifier:	+24dB
Switchable attenuator:	-20dB
Input voltage:	± 275mV, ± 2.0V with attenuator -20dB.
Bandwidth (T/R switch):	0.8 MHz - 25 MHz (-3dB)
Switchable hardware filters (-3dB):	0.5 - 6MHz, 0.5 - 10MHz, 0.5 - 15MHz, 0.5 - 25MHz, 1 – 6MHz, 1 - 10MHz, 1 - 15MHz, 1 - 25MHz, 2 - 6MHz, 2 – 10MHz, 2 – 15MHz, 2 - 25MHz, 4 - 6MHz, 4 - 10MHz, 4 - 15MHz, 4 – 25MHz.

Pulsers specification (2-channels):	
Type:	Step-up, short-circuits pulser; 1. charging-up within PulseTime phase 2. short-circuit discharge
Voltage adjustment:	0V - 460V (positive pulse);
Loading time:	Adjustable from 0 do 6.3µs step 0.1µs;
Short circuit time:	<= 20 ns;
Bandwidth:	Up to 50MHz.

A/D converter:	
Resolution:	10 bit (8-bits are stored);
Maximum input voltage:	±0.5V;
Sampling frequency - switchable (MHz):	100; 50; 33.3; 25; 20; 16.7; 14.3; 12.5;
	11.1; 10; 9.1; 8.3; 7.7; 7.14 and 6.67;
Data buffer:	1 - 262090 (256k) samples;
Measuring frame delay:	0 - 65535 sample periods.

Hardware data processing:	
Data representation:	RF, Absolute;
Measurements in defined frames:	3 peak detectors;
	3 level comparators – modes of transition detection: Level, Rising, Falling, Transition.

DAC (TGC) with arbitrary function generator:	
Sampling frequency	100MHz;
Resolution	8 bit;

Trigger:	
Software	Software command;
Internal	Programmable timer;
*External (not available on standard assembly)	2 incremental encoder modules; 2 TTL inputs.

Ultrasonic channels:	
PE1 (sending&receiving)	Lemo EXG.1B.307 pin 6
PE2 (sending&receiving)	Lemo EXG.1B.307 pin 1

LEMO connector:			
Type:	EXG.1B.307.HLN		
Pinout:	front view:  real view: 		
Pin	**Description**	**Type**	**Description**
1	PE2_signal	HV/RF	PE2: HV pulse output, RF signal input
2	PE2_return	GND	
3	LED1_pos	OC with Rs	Driver: USB 5V, max 100mA Ser. res. installed (R55): 220ohm
4	LED2_pos	OC with Rs	Driver: USB 5V, max 100mA Ser. res. installed (R55): 220ohm
5	PE1_return	GND	
6	PE1_signal	HV/RF	PE1: HV pulse output, RF signal input
7	LEDs_return	GND	

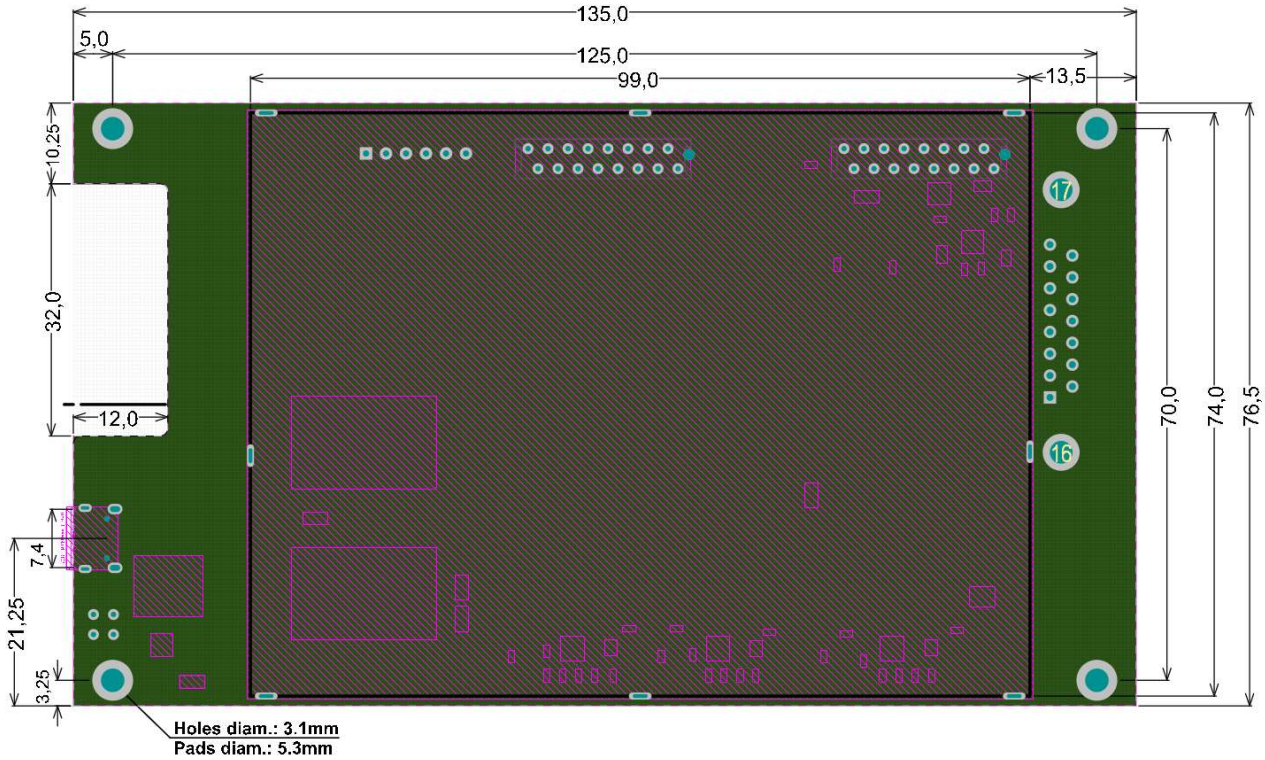
USB interface:	
Connector type:	USB micro-B socket **or** Molex PicoSpox 5-pin socket (“wired-USB”) **Note!** Only one USB connection can be used! Connecting USB micro-B and wired USB can lead to communication errors and USB interface failure or damage!
Standard:	USB-2.0 High Speed (480Mbps)
Vendor ID:	0x0547
Product ID:	0x1003
Hardware version:	2.3 (0x0302)
Power supply:	Bus powered <500mA
USB device class:	Vendor
Available endpoints:	
Endpoint 0 (control register)	Direction: IN/OUT, Type: Control, Packets: max. 64Bytes;
Endpoint 2 (writing TGC curves)	Direction: OUT, Type: Bulk, Packets: max. 512Byte;
Endpoint 6 (reading measurement data)	Direction: IN, Type: Bulk, Packets: max. 512Bytes.

J2B "wired-USB" connector:			
Type:	Molex Pico-SPOX, 5-pin, 1.5mm pitch, single row, low profile, friction lock		
Components:	PCB socket: part no: 874380543 Cable plug: part no: 874390500 Crimp terminals: part no: 874210000		
Pin	Description	Type	Description
1	VBUS	power	USB 5V power supply
2	USB_D-	signal	USB D- data line
3	USB_D+	signal	USB D+ data line
4	GND	ground	Return for data and power lines
5	SHIELD	shield	USB cable shield (shorted to GND)

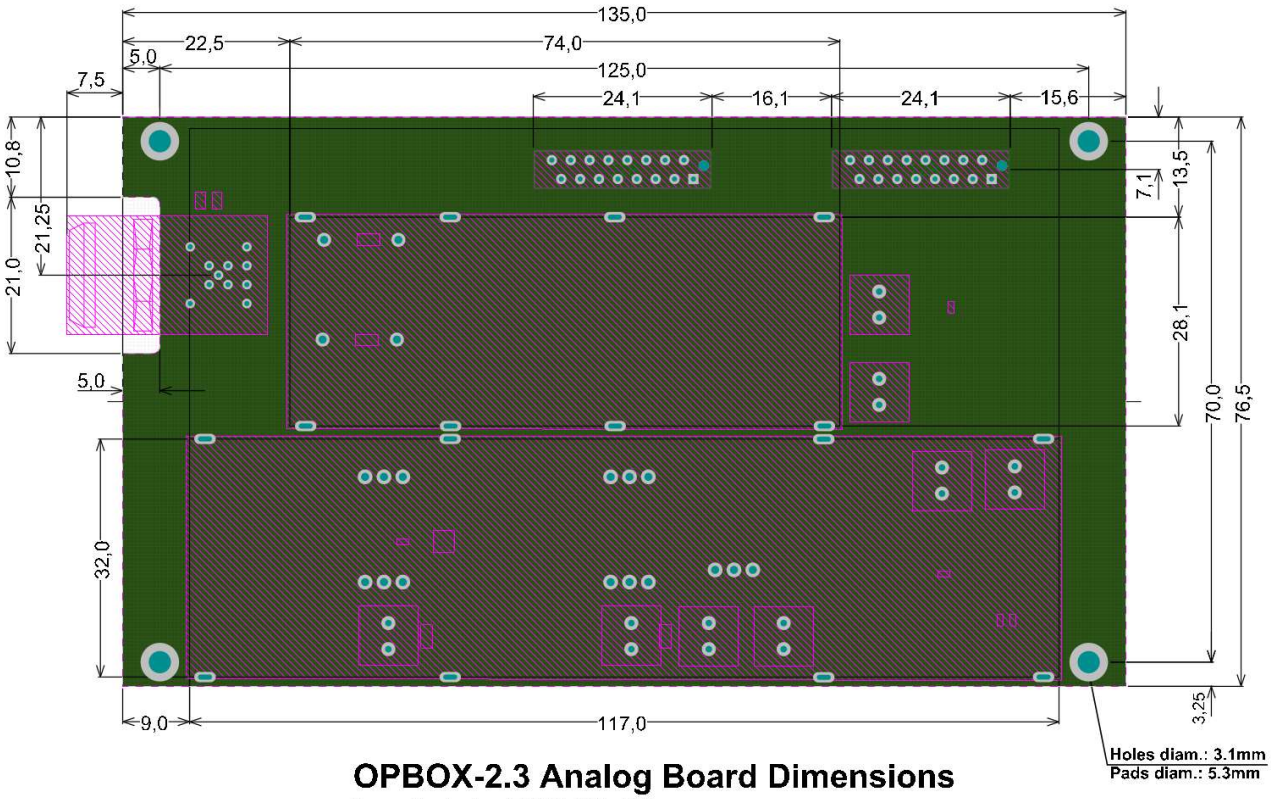
***CONTROL connector (not available on standard assembly, only as a special request):**			
Type:	DB15 female		
DB15 pin	Description	Standard	Description
1	GPO 0	TTL 5V	Digital input GPO0 or synchronization output SYNC_OUT
2	GPO 2	TTL 5V	Digital output GPO2
3	GND		Ground
4	GPI 1	TTL/LVTTL	Digital input GPI1 or trigger input EXT_Y or CHB input for encoder module ENC1
5	GPI 3	TTL/LVTTL	Digital input GPI3 or CHA input for encoder module ENC2
6	GPO 5	TTL 5V	Digital output GPO 5
7	Reserved		Reserved
8	GPI 5	TTL/LVTTL	Digital input GPI5 or IDX input for encoder module ENC2
9	GPO 1	TTL 5V	Digital output GPO1
10	GPO 3	TTL 5V	Digital output GPO3
11	GPI 0	TTL/LVTTL	Digital input GPI0 or trigger input EXT_X or CHA input for encoder module ENC1
12	GPI 2	TTL/LVTTL	Digital input GPI2 or IDX input for encoder module ENC1
13	GPO 4	TTL 5V	Digital output GPO4
14	GND		Ground
15	GPI 5	TTL/LVTTL	Digital inputGPI4 or CHB input for encoder module ENC2

Mechanical specification

Mechanical parameters	
Overall dimensions: boards stacked with 15mm spacers: boards placed flat with 5mm space:	(LxWxH) 135.0 x 76.5 x 29.0mm (with shields) 135.0 x 158.0 x 19.0mm (with shields)
Digital board dimensions: board LxW board thickness top shield height bottom B2B connector height USB connector height bottom SMD components height	 135.0 x 76.5mm 1.6mm 5.0mm 4.3mm (open), 7.7mm (mated) 2.9mm <2.0mm
Analog-board dimensions: board LxW board thickness top shield height bottom SMD components height	 135.0 x 76.5mm 1.6mm 14.0mm (pulser shield can) <3.0mm
Lemo connector offset: (beyond PCB outline)	about 7.5mm
USB connector offset: (beyond PCB outline)	about 0.9mm
B2B Flat cable offset: (beyond PCB outline)	about 3.0mm
Mounting holes:	4x holes for M3 spacers/screws, centered on square 125x70mm
Weight (both boards with shields):	215g



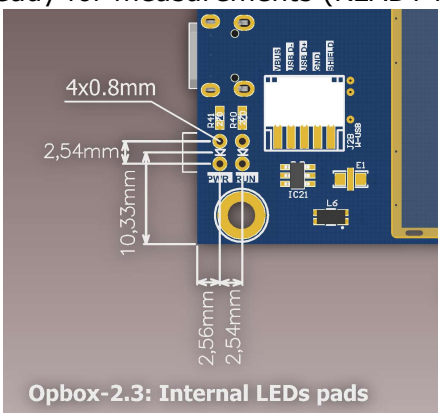
OPBOX-2.3 Digital Board Dimensions
(rev.1, date: 2021-05-18)



OPBOX-2.3 Analog Board Dimensions
(rev.1, date: 2021-05-18)

Internal LEDs locations on Digital board:

PWR LED (red):
blinking - powered down or power failure (INITIAL/SLEEP mode);
solid on - powered up, ready for measurements (READY mode).



Opbox-2.3: Internal LEDs pads

RUN LED (yellow):
ON when acquisition is in progress and/or there is a data available in the FIFO;
OFF otherwise.