



uWAVE USBL Underwater acoustic  
modem specifications

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## KEY FEATURES

- Extremely small size and weight
- Simultaneous data transmission & USBL navigation
- Reliable data transmission with 78 bit/s
- Operating range up to 3000<sup>1</sup> m
- Subscribers code division
- Propagation time measurement
- Reliable and noise-immune technology of digital broadband acoustic communication
- Low power consumption (Rx/Tx) 0.33/6 W
- Open & easy interfacing protocol
- Built-in depth/temperature sensor

**uWAVE USBL Modem** - a device that combines the functions of transmitting data through a underwater acoustic channel and a navigation system on an ultra-short base.

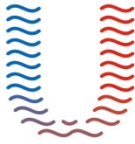
Using **uWAVE USBL Modems**, the user can:

- transfer arbitrary user data between **uWAVE USBL Modem**, **uWAVE Max** and **uWAVE** modems in any combination with the simultaneous estimation of the horizontal angle of arrival;
- estimate the location of the **uWAVE USBL Modem**, **uWAVE Max** and **uWAVE** modems in command mode by slant range and horizontal angle of arrival;
- transmit up to 9 short code telecontrol user commands;
- request from remote modems **uWAVE USBL Modem**, **uWAVE Max** and **uWAVE** their depth, temperature and voltage;
- measure own depth, temperature and voltage;

**uWAVE** family devices use a simple open NMEA-like configuration protocol, and the supplied open-source **uWAVELib** library allows for the fastest and easiest integration of devices into user solutions.

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<sup>1</sup> While working with uWAVE USBL Modem or uWAVE Max. Max operating range with uWAVE modems is 1000 m.



UNDERWATER  
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## TECHNICAL SPECIFICATIONS

DIMENSIONS ( $\Phi$ x h)	64 x 128 mm
WEIGHT (dry)	0.44 kg
DEPTH RATING	300 m
MAX OPERATING RANGE	3000 <sup>2</sup> m
PAYLOAD DATA RATE	78 bit/s
POWER CONSUMPTION Rx/Tx	0.33/25 W
HORIZONTAL ANGLE OF ARRIVAL ESTIMATION ACCURACY (typ.)	1°
SUPPLY VOLTAGE	12 V
DATA LINES VOLTAGE	0 .. 3.3 V
FREQUENCY BAND	10 .. 30 kHz
BIT ERROR RATE	10 <sup>-6</sup>
SNR <sup>3</sup>	-2 dB
MAX RELATIVE VELOCITY	+/- 1 m/s
RATED STARTUP TIME	100 msec
WORKING TEMPERATURE RANGE	-5 .. 50 °C
INTERFACE <sup>4</sup>	UART 9600 bit/s
INTERFACING PROTOCOL	NMEA 0183 PUWV
WIRE LENGTH <sup>5</sup>	1 m
SUBSCRIBERS CODE DIVISION	20 code channels
COMMAND MODE	16 predefined code messages (9 for user applications)

<sup>2</sup> While working with uWAVE USBL Modem or uWAVE Max. Max operating range with uWAVE modems is 1000 m.

<sup>3</sup> This value is obtained without the presence of the multipath effect

<sup>4</sup> Can be changed by the special request

<sup>5</sup> Can be changed by the special request