EvoLogics GmbH develops underwater information and communication systems based on bionic concepts, combining cutting edge engineering with the best ideas found in nature. The advanced product features have become enabling technologies for deep water exploration and production.

EvoLogics range of products offers highly reliable, flexible and cost-effective solutions for multiple underwater communication, positioning, navigation and monitoring applications. We strive for innovation and invest our vast experience into developing, manufacturing and supporting products that deliver an excellent performance and solve the most challenging tasks.

The company was founded in 2000 in Berlin, Germany, by a group of leading international scientists and maritime engineering experts. The company since focuses on developing innovative solutions for maritime and offshore industries, as well as smart robotic systems design and bionic research.

EvoLogics GmbH
Ackerstrasse 76
13355 Berlin, Germany
tel.: +49 30 4679 862 - 0
fax: +49 30 4679 862 - 01
sales@evologics.de

UNDERWATER ACOUSTIC MODEMS

PRODUCT INFORMATION GUIDE

APPLICATIONS

Oil & Gas
Support deepwater oil and gas exploration with a reliable communication system that provides real-time transmissions of sensor data or sending commands to remote equipment

Unmanned Underwater Vehicles (ROVs and AUVs)
Real-time tracking and data acquisition, command transmissions with instant messaging feature - send commands on top of the main data flow from sensors or cameras

Oceanography
Collect measurement data from various sensors in real-time or over periodic intervals, store and transmit data with adjustable priorities. Low power consumption and a power saving wake-up module enable long-term deployments

Monitoring Stations
Integrate the communication system with a power source, multiple sensors and an acoustic releaser for a fully autonomous solution for long-term data collection missions

Seismic
Collect seismic data and use the instant messaging feature for alarm-triggering events

Networks and Relay chains
Transmit information over longer distances or cover a larger area

Information and Communication Centers
Advanced data management and expandable modular design can become the central point for all your underwater communication needs

UNDERWATER ACOUSTIC MODEMS

EvoLogics underwater acoustic modems provide full-duplex digital communication using EvoLogics' patented S2C (Sweep-Spread Carrier) Technology, delivering an excellent performance, resistant to the challenges of the dynamic subsea environment. Self-adaptive algorithms adjust the S2C parameters to maintain the highest bitrate possible in current conditions.

Every EvoLogics underwater acoustic modem implements advanced data delivery algorithms, supports addressing and networking and is easy to control with a comprehensive set of commands and software-configurable settings.

- Use as transponders, beacons and pingers - all modems are fully compatible with EvoLogics USBL/LBL positioning systems and can facilitate simultaneous communication and navigation.
- WiSE and SDM devices offer extra opportunities for developers.
- OEM versions without housing and streamlined transducer units are available for system integration with UUVs.

<table>
<thead>
<tr>
<th>OPERATING RANGE, m</th>
<th>BITRATE, kbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>S2C M HS S2C R 48/78 S2CM 42/65</td>
</tr>
<tr>
<td>1000</td>
<td>S2CR 18/34H S2CM 18/34</td>
</tr>
<tr>
<td>3500</td>
<td>S2CR 12/24 S2CR 15/27</td>
</tr>
<tr>
<td>6000</td>
<td>S2CR 7/17W S2CR 7/17D</td>
</tr>
<tr>
<td>8000</td>
<td>S2CR 7/17</td>
</tr>
<tr>
<td>10000</td>
<td>S2CR 12/24</td>
</tr>
</tbody>
</table>

The R-series offers a broad selection of short- mid- and long-range devices for shallow or deep water applications. The M-series of "mini"-modems targets size- and weight-sensitive applications with a lighter and more compact design. S2C R WiSE and SDM modems provide extra features for developers.
UNDERWATER ACOUSTIC MODEMS

EvoLogics underwater acoustic modems provide full-duplex digital communication using EvoLogics’ patented S2C (Sweep-Spread Carrier) Technology, delivering an excellent performance, resistant to the challenges of the dynamic subsea environment. Self-adaptive algorithms adjust the S2C parameters to maintain the highest bitrate possible in current conditions.

Every EvoLogics underwater acoustic modem implements advanced data delivery algorithms, supports addressing and networking and is easy to control with a comprehensive set of commands and software-configurable settings.

- Use as transponders, beacons and pingers - all modems are fully compatible with EvoLogics USBL/LBL positioning systems and can facilitate simultaneous communication and navigation.
- WISE and SDM devices offer extra opportunities for developers.
- OEM versions without housing and streamlined transducer units are available for system integration with UUVs.

APPLICATIONS

Oil & Gas
Support deepwater oil and gas exploration with a reliable communication system that provides real-time transmissions of sensor data or sending commands to remote equipment

Unmanned Underwater Vehicles (ROVs and AUVs)
Real-time tracking and data acquisition, command transmissions with instant messaging feature - send commands on top of the main data flow from sensors or cameras

Oceanography
Collect measurement data from various sensors in real-time or over periodic intervals, store and transmit data with adjustable priorities. Low power consumption and a power saving wake-up module enable long-term deployments

Monitoring Stations
Integrate the communication system with a power source, multiple sensors and an acoustic releaser for a fully autonomous solution for long-term data collection missions

Seismic
Collect seismic data and use the instant messaging feature for alarm-triggering events

Networks and Relay chains
Transmit information over longer distances or cover a larger area

Information and Communication Centers
Advanced data management and expandable modular design can become the central point for all your underwater communication needs

The R-series offers a broad selection of short- mid- and long-range devices for shallow or deep water applications.

The M-series of "mini"-modems targets size- and weight-sensitive applications with a lighter and more compact design.

S2CRM WISE and SDM modems provide extra features for developers.
**DEVELOPER TOOLS**

**S2C WISE-Series modems**: the sandbox - an embedded network protocol development platform - provides an excellent testbed. Run custom networking scripts, sensor-specific data preprocessing scripts and modules directly on real hardware in real-world conditions.

**S2C Modern Emulator**: test protocols and/or application solutions without underwater modems. A time-saver for code debugging and refinement. Solutions, designed and tested with the emulator, are easy to export to modern hardware. Available over remote access or as a standalone EvoLogics Modern Emulator Box.

**Software Defined Modem (SDM) mode**: transmit and receive arbitrary waveforms and set a reference to trigger signal detection.

**S2CR WISE Modems**

<table>
<thead>
<tr>
<th>GENERAL</th>
<th>Same as S2CR-series modems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIRMWARE</strong></td>
<td>16-64 MB sandbox (extendable up to 64 GB with SD card)</td>
</tr>
</tbody>
</table>
### Specifications and Configuration Options

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Depth</strong></td>
<td>Debris</td>
<td>Aluminium Alloy</td>
<td>Stainless Steel</td>
<td>Titanium</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
<td>200 m</td>
</tr>
<tr>
<td><strong>Transducer Beam Pattern</strong></td>
<td>Horizontally omnidirectional</td>
<td>Horizontally omnidirectional</td>
<td>Hemispherical</td>
<td>Hemispherical</td>
<td>up to 31.2 kbit/s</td>
<td>up to 31.2 kbit/s</td>
<td>up to 13.9 kbit/s</td>
<td>up to 9.2 kbit/s</td>
<td>up to 5.9 kbit/s</td>
<td>up to 31.2 kbit/s</td>
<td>up to 31.2 kbit/s</td>
<td>up to 13.9 kbit/s</td>
<td>up to 6.5 kbit/s</td>
<td>up to 6.5 kbit/s</td>
<td>up to 6.5 kbit/s</td>
<td>up to 31.2 kbit/s</td>
<td>up to 13.9 kbit/s</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
<td>2.5 mW</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>Ø 110 x 178 mm</td>
<td>265 mm</td>
<td>Ø 110 x 178 mm</td>
<td>265 mm</td>
<td>Ø 110 x 218 mm</td>
<td>265 mm</td>
<td>Ø 110 x 218 mm</td>
<td>390 mm</td>
<td>Ø 110 x 230 mm</td>
<td>390 mm</td>
<td>Ø 110 x 178 mm</td>
<td>265 mm</td>
<td>Ø 110 x 178 mm</td>
<td>265 mm</td>
<td>Ø 110 x 178 mm</td>
<td>265 mm</td>
<td>Ø 110 x 178 mm</td>
</tr>
<tr>
<td><strong>Weight, dry/wet</strong></td>
<td>2250/400 g</td>
<td>2300/300 g</td>
<td>2245/400 g</td>
<td>3105/188 g</td>
<td>2990/490 g</td>
<td>2990/490 g</td>
<td>4700/660 g</td>
<td>6200/600 g</td>
<td>3000/400 g</td>
<td>1120/330 g</td>
<td>1210/420 g</td>
<td>1265/480 g</td>
<td>1120/330 g</td>
<td>2250/400 g</td>
<td>2445/400 g</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General

**Surface Buoy Vessel**
- **S2C Modem Emulator**: test protocols and/or application solutions without underwater modems. A time-saver for code debugging and custom networking scripts, sensor-specific data preprocessing scripts and modules directly on real hardware in real-world conditions.

**S2C WiSE-Series modems**: the sandbox - an embedded network protocol development platform - provides an excellent testbed. Run waveforms and set a reference to trigger signal detection.

### Developer Tools

- **Firmware**
- **General**
- **Validation**
- **Sensor Node**

- Low power consumption and additional power-saving options.
- Advanced communication protocol with several data transmission modes.
- Built-in forward error correction and data compression.
- Multiple data streams with user-adjustable priorities.

### Applications

- Fast short and medium range communications in horizontal channels.
- Fast short and medium range communications in vertical and horizontal channels.
- Medium range communications in short channels.
- Medium range communications in horizontal channels.
- Medium range communications in vertical and short channels.
- Long range transmissions in vertical and short channels, long range deployment.
- Long range transmissions in vertical and short channels, deepwater.
- Long range transmissions in vertical and short channels, deepwater.
- Long range transmissions in vertical and vertical channels, deepwater.
- Long range transmissions in short channels, deepwater.
- Long range transmissions in short channels, deepwater.
- Long range transmissions in vertical channels, depth.
- Long range transmissions in short channels, depth.

### Wake-Up Module

- **Not compatible with Ethernet**
- The Wake-Up Module turns off the device if it detects incoming acoustic signals or incoming data on one host interface. Once the device completes receiving or transmitting data, it switches itself off. 2-channel version available for Ethernet.

### Power Switch

- **Not compatible with Ethernet**
- The Power Switch allows to provide power supply to up to 4 external instruments and turn them on/off on command.

### Advanced TIMEKEEPING Module

- **Not compatible with Ethernet**
- Allows to accept an IP input from GPS, optionally includes a Chip Scale Attitude Clock for highly precise timekeeping.

### SONAR

- **Not available**
- Software behind Module: transmit/receive arbitrary waveforms and set a reference to trigger signal detection.

### ACOUSTIC RELEASE DEVICE

- **Not available**
- Reliable mechanism for recovery of underwater assets to the surface. Not available in OEM version for system integrators.

### FLOATATION COLLAR

- **Not available**
- Floatation collar for fast recovery to the surface.

### Pressure Sensor

- **Not available**
- Accurate pressure measurements.

### Cable-Mounted Transducer

- **Not available**
- Separated transducer for easier system integration.

### OEM Version

- **Not available**
- Version without housing, transducer and electronics for system integrators.

### Wake-up Options

1) One RS-232 Interface can be replaced with an RS-422 interface. Contact Ecologics for more information.
2) Power consumption for S2CR/232 interface. Add 500 mV if Ethernet interface is installed. Add 300 mV if the Wake-Up Module is installed. User-configurable Listen Mode is only available with a Wake-Up module installed. Power consumption in Listen Mode depends on Listen Mode settings.
3) Contact Ecologics for more information on external and internal power supply options.
4) S2CR 48/78, 42/65 - dimensions of a Debris housing, other builds are slightly larger. S2CR 12/24, 7/17 - dimensions of areferrer housing, other builds are slightly smaller. Contact Ecologics for more information on device dimensions and weights.
5) The Wake-Up Module is only compatible with RS-232 interface. It is not compatible with Ethernet or RS-422.

### Wake-up Options

- **Not available**
- Single channel version only.

### Contact Information

- For more information, contact Ecologics.

### Specifications subject to change without notice. © Ecologics GmbH - August 2017
ABOUT US

EvoLogics GmbH develops underwater information and communication systems based on bionic concepts, combining cutting edge engineering with the best ideas found in nature. The advanced product features have become enabling technologies for deep water exploration and production.

EvoLogics range of products offers highly reliable, flexible and cost-effective solutions for multiple underwater communication, positioning, navigation and monitoring applications. We strive for innovation and invest our vast experience into developing, manufacturing and supporting products that deliver an excellent performance and solve the most challenging tasks.

The company was founded in 2000 in Berlin, Germany, by a group of leading international scientists and maritime engineering experts. The company since focuses on developing innovative solutions for maritime and offshore industries, as well as smart robotic systems design and bionic research.

EvoLogics GmbH
Ackerstrasse 76
13355 Berlin, Germany
tel.: +49 30 4679 862 - 0
fax: +49 30 4679 862 - 01
sales@evologics.de
evologics.de

EUROPÄISCHE UNION
Europäischer Fonds für regionale Entwicklung
Investition in Ihre Zukunft