PERSONAL SERVICE

Customers are Star-Oddi's best advisors. We are always looking for new ideas and ways to improve our products. Please contact us if you have any suggestions for us.

STAR-ODDI LTD.

Founded in Iceland in 1985, Star-Oddi has become recognized as one of the world's leading manufacturers of technology for research and industrial use.

Since 1993, Star-Oddi has been manufacturing the Data Storage Tag (DST), a miniature data logger. DST's are ideal for various types of research where small reliable loggers are needed. Star-Oddi operates in the global marketplace. Our mission is to offer excellent quality, reliable and well designed products.

THE STORY BEHIND THE NAME:

THE SAGA OF STAR-ODDI (STJÖRNU-ODDI)

Oddur Helgason lived and worked in Flatey, Skjalfanda, in northern Iceland in the twelfth century. He was a hired labourer on a farm and stood out because of his outstanding knowledge. He used a lot of his time analyzing the movements of the sun, moon and stars resulting in his nickname Star-Oddi.

Star-Oddi's work is considered to be one of the greatest engineering achievements of the Viking Age. His research enabled Vikings to sail over long distances and find their way back home. Scientists have shown that he made remarkably exact observations, centuries ahead of his time.

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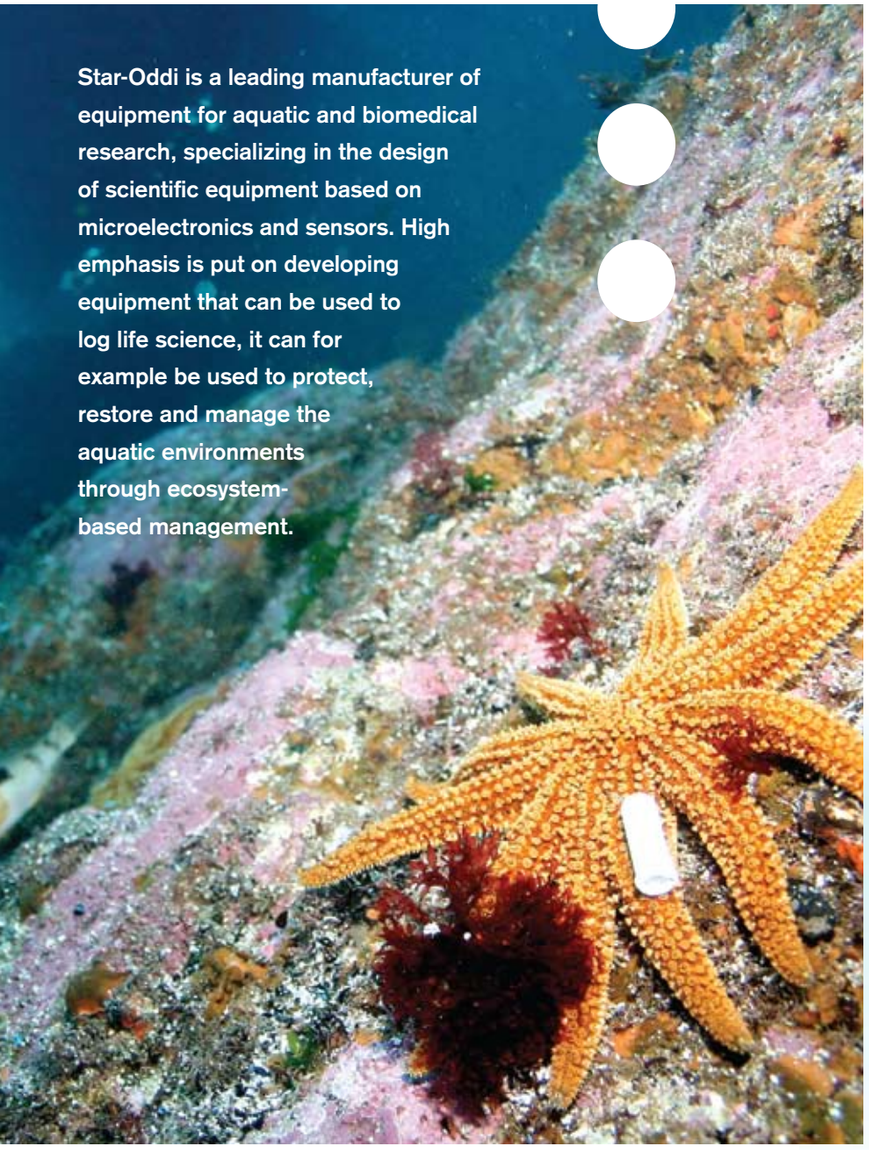
Data Storage Tags (DST)

STAR ODDI

Logging Life Science

www.star-oddi.com



Star-Oddi is a leading manufacturer of equipment for aquatic and biomedical research, specializing in the design of scientific equipment based on microelectronics and sensors. High emphasis is put on developing equipment that can be used to log life science, it can for example be used to protect, restore and manage the aquatic environments through ecosystem-based management.

Changes could occur without notice

DATA STORAGE TAGS (DSTs)

Star-Oddi's DST's were originally developed for tagging fish and other animals living in saline and fresh waters. DST's are used in analyzing the tagged animal's migration, distribution, feeding and spawning behavior, vertical/horizontal movements or geographic location. In recent years they have found use in such industries as biomedical research, nature research, the food & beverage industry and other industries.

The loggers can be fastened externally or implanted in the animal. The DST housing is made of alumina, a biocompatible ceramic material that is not recognized as a foreign object by the animal.

DST's can also be used as standalone loggers for environmental monitoring or attached to fishing gear or other underwater equipment.
All measured data is stored in the logger's internal memory. When the logger is retrieved after the measuring period, recorded data is uploaded in the supporting software where it can be viewed and analyzed in graphic and tabular form. The same logger can be reused as long as the battery lasts.

SENSORS

- TEMPERATURE
- PRESSURE (DEPTH)
- CONDUCTIVITY (SALINITY)
- TILT
- MAGNETIC FIELD STRENGTH (COMPASS)
- LIGHT INTENSITY
- ACOUSTIC RECEIVER
- ACOUSTIC TRANSMITTER

PRODUCT FAMILY

The DST product family features four different sizes: **centi, milli, micro and nano**. The DST loggers vary in size, memory size, battery life and sensors.

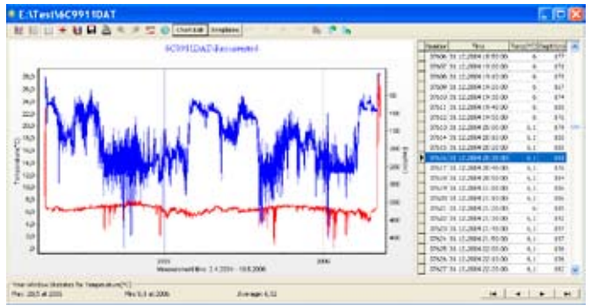
SEASTAR

SeaStar (for Windows©) is the graphic supporting software for all Star-Oddi loggers. The user sets the start time, start date and sampling interval in SeaStar before starting the logger. Sampling interval can be set in second(s), minute(s) and/or hour(s).

With default programming all parameters are recorded at the same time. It is possible to define different sampling intervals for the parameters (primary and secondary parameters/parameter pairs with different sampling frequency). With this option memory partitioning can be customized according to individual preferences.

DSTs can also be programmed with up to 7 different sampling intervals. These intervals can then be defined in a preferred order within a measurement sequence. Number of measurements is defined for each interval. The measurement sequence is repeated until the memory is full or the logger retrieved. Programming several sampling intervals in a sequence can be useful when more/fewer measurements are needed at certain time periods.

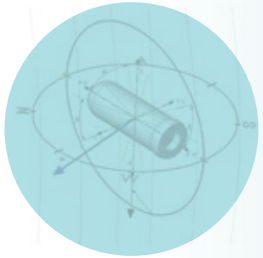
Recorded data is uploaded in SeaStar where the results can be analyzed in graphic and tabular form along with date and time. The logger can be reprogrammed and reused as long as the battery lasts. Data can be retrieved even after the logger's battery is empty.



SeaStar software

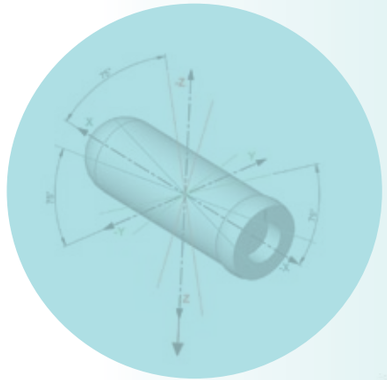
COMMUNICATION BOX

The Communication Box works as an interface for data transfer between the DSTs and a PC. Communication between a DST and the Communication Box is wireless. The Communication Box is connected to a PC using either a USB or RS-232C 9 pin serial cable. When a logger is connected to a PC the logger is powered through the Communication Box and is not using its internal battery.



DSTs are being used in various fields and studies, such as:

- **Oceanography**
- **Marine biology**
- **Ichthyology**
- **Limnology**
- **Hydrology**
- **Geology**
- **Tagging projects**
- **Aquaculture projects**
- **Studies on underwater equipment**



OTHER ACCESSORIES

There is a wide range of accessories for Star-Oddi products available. For fish and other animal tagging we provide special fastening and tag holder kits that make the tagging process easier and safer.

When DST's are used as standalone loggers in harsh environments it is advised to use protective housings to protect the loggers. Star-Oddi offers plastic protective housings for all logger sizes.

Tag holder

PUR H housing

Tilt protective housing

SPECIAL FEATURES

For most DSTs Star-Oddi offers special features such as logic start/stop recording control, calibration outside standard ranges and memory extensions. For more information, please contact Star-Oddi or visit www.star-oddi.com.







DST TECHNICAL SPECIFICATIONS

	DST nano-T/TD	DST micro - T/TD	DST milli -T/TD	DST milli - L	DST centi - T/TD	DST CT	DST CTD	DST tilt	DST magnetic	DST bird
Sensors	Temperature, pressure (depth) Available in temperature only	Temperature, pressure (depth) Available in temperature only	Temperature, pressure (depth) Available in temperature only	Temperature, pressure (depth)	Temperature, pressure (depth) Available in temperature only	Conductivity (salinity), temperature	Conductivity (salinity), temperature, pressure (depth)	Tilt (3-D), temperature, pressure (depth)	Magnetic field strength (3-D) (compass heading), tilt (3-D) temperature, pressure (depth)	Temperature, light
Size: diameter x length	6mm x 17.5mm (enclosure ring on TD is 7mm in diameter)	8.3mm x 25.4mm	12.5mm x 38.4mm	12.5mm x 38.4mm	15mm x 46mm	15mm x 46mm	15mm x 46mm	15mm x 46mm	15mm x 46mm	17mm x 7mm x 7mm
Weight (in air / in water)	1.3g / 0.8g	3.3g / 1.9g	9.2g / 5g	9.2g / 5g	19g / 12g	21g / 13g	21g / 13g	19g / 12g	19g / 12g	1.5g
Battery life	9 months*	18 months*	3 years*	3 years*	7 years*	4 years*	4 years*	4 years*	18 months*	18months*
Memory type	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM	Non-volatile EEPROM
Memory capacity / size of one measurement (bytes)	16,062 bytes / temperature 1.5 bytes, pressure 1.5 bytes	65,214 bytes / temperature 1.5 bytes, pressure 1.5 bytes	65,375 bytes / temperature 1.5 bytes, pressure 1.5 bytes	65,375 bytes / temperature 1.5 bytes, pressure 1.5 bytes	261,819 bytes / temperature 1.5 bytes pressure 1.5 bytes	392,478 bytes / conductivity-temperature 3 bytes	392,478 bytes / conductivity-temperature-pressure 4,5 bytes	261,564 bytes / temperature-pressure 3 bytes, tilt 6 bytes	261,564 bytes / temperature-pressure 3 bytes, compass (MFS)-tilt 13 bytes	65,214 bytes / temperature 1.25 byte, light 1.25 byte
Memory extension option			1,048,046 bytes (FLASH memory)	1,048,046 bytes (FLASH memory)	786,099 bytes (EEPROM memory)					
Data resolution	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits / 14 bits	10 bit
Temperature range	-1°C to 40°C (30.2°F to 104°F)**	-1 to 40°C (30.2°F to 104°F)**	-1°C to 40°C (30°F to 104°F)***	-1°C to 40°C (30°F to 104°F)***	-1°C to 40°C (30°F to 104°F)***	-1°C to 40°C (30°F to 104°F)	-1°C to 40°C (30°F to 104°F)	-1°C to 40°C (30°F to 104°F)***	-1°C to 40°C (30°F to 104°F)	-2°C to 30°C (28.4°F-86°F)
Temperature resolution	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.032°C (0.058°F)	0.1°C (0.18°F)
Temperature accuracy	+/- 0.2 °C (+/- 0.36°F)	+/- 0.2 °C (+/- 0.36°F)	+/- 0.1°C (0.18°F)	+/- 0.1°C (0.18°F)	+/- 0.1°C (0.18°F)	+/- 0.1°C (0.18°F)	+/- 0.1°C (0.18°F)	+/- 0.1°C (0.18°F)	+/- 0.1°C (0.18°F)	+/- 0.5°C (0.9°F)
Temperature response time	Time constant (63%) reached in 8 sec.	Time constant (63%) reached in 10 sec.	Time constant (63%) reached in 12 sec.	Time constant (63%) reached in 12 sec.	Time constant (63%) reached in 20 sec.	Time constant (63%) reached in 20 sec.	Time constant (63%) reached in 20 sec.	Time constant (63%) reached in 20 sec.	Time constant (63%) reached in 20 sec.	Time constant (63%) reached in 18 sec.
Standard depth/pressure ranges (user defined)	200m, 500m, 1000m***	150m, 300m, 1000m	20m, 50m, 100m, 250m, 500m, 800m	20m, 50m, 100m, 250m, 500m, 800m	30m, 50m, 100m, 270m, 800m, 3000m		100m, 500m, 1200m, 2000m	30m, 50m, 100m, 270m, 800m, 1500m, 2000m, 3000m	30m, 50m, 100m, 270m, 800m, 1500m, 2000m, 3000m	
Depth/pressure resolution	0.08% of selected range	0.08% of selected range	0.03% of selected range	0.03% of selected range	0.03% of selected range		0.03% of selected range	0.03% of selected range	0.03% of selected range	
Depth/pressure accuracy	Better than 0.6% of selected range	+/- 0.5% of selected range	+/- 0.4% of selected range for 20m - 500m +/- 0.6% of selected range for 800m	+/- 0.8% of selected range	+/- 0.4% of selected range for 30m - 270m +/- 0.6% of selected range for 800m - 3000m		+/- 0.4% of selected range for 100m - 500m +/- 0.6% of selected range for 1200m - 2000m	+/- 0.4% of selected range for 30m - 270m +/- 0.6% of selected range for 800m - 3000m	+/- 0.4% of selected range for 30m - 270m +/- 0.6% of selected range for 800m - 3000m	
Depth/pressure response time	Immediate	Immediate	Immediate	Immediate	Immediate		Immediate	Immediate	Immediate	
Standard conductivity ranges (user defined)						1) 3 to 37 mS/cm 2) 10 to 50 mS/cm 3) 0.2 to 6 mS/cm	1) 3 to 37 mS/cm 2) 10 to 50 mS/cm 3) 0.2 to 6 mS/cm			
Conductivity resolution						0.01 mS/cm	0.01 mS/cm			
Conductivity accuracy						+/- 1.5 mS/cm	+/- 1.5 mS/cm			
Salinity resolution						0.02 PSU	0.02 PSU			
Salinity accuracy						+/- 1 PSU****	+/- 1 PSU****			
Compass resolution									1°	
Compass accuracy									+/- 15°	
Tilt resolution								0.2°	0.2°	
Tilt accuracy								+/- 3°	+/- 3°	
Tilt range								360°	360°	
Magnetic field strength range									0 to 2 gauss	
Magnetic field strength resolution									30nT	
Magnetic field strength accuracy									+/-100nT	
Light range										10-400 lux
Light resolution										2 lux
Light accuracy										+/- 25 lux

*For a sampling interval of 10 min. **5°C to 45°C (32°F to 113°F) for temperature only unless otherwise requested ***Outside ranges available upon request ****Based on conductivity full scale accuracy at 24°C Specifications are subject to change without notice