SONOTRONICS

PRODUCT OVERVIEW and PRICE LIST

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SONOTRONICS

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SUGGESTED READING

Several titles are available from American Fisheries Society. More information is available on the “Publications” link of the American Fisheries Society website. The URL is listed below:

http://www.fisheries.org/html/index.shtml

A recommended title:

These include Fisheries Techniques, edited by Larry Nielsen and David Johnson, and Fish-Marking Techniques edited by N.C. Parker et al.

Updates on the use of open systems in acoustic telemetry:

https://europeantrackingnetwork.org/en/important-information-acoustic-telemetry-users

PRODUCTS OVERVIEW

As a leader in the manufacture of ultrasonic tracking equipment since 1971, Sonotronics products traditionally fall into two categories: fisheries research and equipment marking:

Fisheries Research Products:

-Ultrasonic transmitters:

-Coded: Allows for unique identification of individuals, while determining movement, passage and location.

-Telemetry: In addition to the above, provides parametric temperature and depth data, mortality, and other environmental information.

-Echosounder Transceivers: Permits tracking using a scientific echosounder, responding to a 200kHz trigger signal with a 500kHz coded pulse for individual identification.

-Receivers:

-Active Tracking: Manual systems allowing real-time tracking and monitoring.

-Passive Tracking: Submersible ultrasonic receivers for automated logging of fish ID along with time and date stamp for fish passage and habitat studies. Single units can mark entrances/ exits to key parts of a system, while curtains and arrays can be used for higher resolution fish movement data.

-Hydrophones: A variety of directional and omnidirectional hydrophones.

Equipment Marker Products:

-Equipment Marker Pingers: Special high output pingers with holes for ease of mounting. Various combinations of lifetime, size, range, and telemetry options available, including Tilt Angle Pingers That report their angle of orientation to gravity in real time, allowing for monitoring of tilt angle during equipment deployment applications.

-Deck Unit Receiver (MANTRAK kit): Receivers used on the search vessel to determine the vicinity and bearing to begin a dive towards target.

-Underwater Diver Receivers (UDR-kit): UDR allows for approach directly to the target in extreme low visibility environments.

-ROV mounted Hydrophone (DH-ROV): An ROV mountable directional hydrophone allowing a deck receiver to monitor emissions in the vicinity of a searching underwater vehicle.

Fisheries Research Products

CODED TAGS

Below are the families of Sonotronics transmitters, listed in order of size from smallest to largest. All transmitters are coded with our unique "integrated tracking approach" algorithm, allowing thousands of transmitters to be uniquely identified by passive receivers (SURs) and while actively tracking (USR-23, DH-4).

PICO TAGS: PT series

FREQUENCY: 69 - 83 kHz
RANGE: 300—750m +

MINIATURE TAGS: IBT-96 series

FREQUENCY: 69 - 83 kHz
RANGE: 500m +

TRACKING TAGS: CT series

FREQUENCY: 34 - 40, 69 - 83 kHz
RANGE: To 1000 meters.

HIGH POWER TAGS: CHP-87 series

Similar to the CT-82, except the output power is significantly higher.

FREQUENCY: 34 - 40, 69 - 83 kHz
RANGE: To 3000 meters.

NOTE: There is a small battery drain while transmitters are "sleeping": this drain may be negligible in long life transmitters, but on short lifetime transmitters this drain may be significant. If transmitters will be stored for longer than 2 months before deployment, it is recommended that the user contact Sonotronics for battery loss information. Also note that lifetimes for these tags may be increased significantly by having them pre-programmed to cycle on and off. Please contact Sonotronics for more information about this technique.

COMPATIBILITY

Sonotronics is partnering with the European Telemetry Network (ETN) to improve interoperability among vendors of acoustic telemetry equipment worldwide. Although some measure of compatibility already exists as seen in the chart below, an explicitly open protocol (OP) is now available for use on all fisheries products. Please contact Sonotronics for more information, or view additional information on the ETN website under "Open Protocol".

Old name	Thelma	Sonotronics	Lotek	MAP-110*	MAP-112*	MAP-113*	MAP-114*
	OPi	OPi	OPi	-	-	-	-
	OPs	OPs	OPs	-	-	-	-
R64K	A69-1303	A69-1303	A69-1303	A69-1303	A69-1303	A69-1303	A69-1303
S256	A69-1105	A69-1105	A69-1105	A69-1105	A69-1105	A69-1105	-
R04K	A69-1206	A69-1206	-	A69-1206	A69-1206	-	-
R256	A69-1008	-	-	A69-1008	-	-	-

TELEMETRY TAGS

TEMPERATURE TAG: CTT-83 series

FREQUENCY: 34 - 40, 69 - 83 kHz
RANGE: To 1000 meters.
RESOLUTION: 0.5° C.
CALIBRATION: Precalibrated for +/- 1 deg C, can be calibrated by the user to +/- .5 deg C

MINI TEMPERATURE TAG: IBTT series

FREQUENCY: 69 - 83 kHz
RANGE: To 1000 meters.
RESOLUTION: 0.5° C.
CALIBRATION: Precalibrated for +/- 1 deg C, can be calibrated by the user to +/- .5 deg C

PICO TEMPERATURE TAG: PTT series (smallest telemetry transmitters)

FREQUENCY: 69 - 83 kHz
RANGE: To 1000 meters.
RESOLUTION: 0.5° C.
CALIBRATION: Precalibrated for +/- 1 deg C, can be calibrated by the user to +/- .5 deg C

DEPTH TAG: DT-97 series

FREQUENCY: 34 - 40, 69 - 83 kHz
RANGE: To 3000 meters.
DEPTH RANGE: 50, 100, 200, 300 & 500 PSI.
ACCURACY: Pressure, ± 1% of full scale. 0 to 35 deg.C.
RESOLUTION: 1%.
ATTACHMENT: 1/16" hole at both ends.

MINI DEPTH TAG: IBDT-97 series

FREQUENCY: 69 - 83 kHz
RANGE: 500 meters+.
DEPTH RANGE: 50 or 100 PSI.
ACCURACY: ± 1% of full scale
RESOLUTION: 1%.
ATTACHMENT: 1/16" hole at both ends.

ACTIVITY TAG: AT-82 series

FREQUENCY: 34 - 40, 69 - 83 kHz
RANGE: To 1000 meters.
RESOLUTION: 16mg
SENSOR: 3 axis accelerometer

MINI ACTIVITY TAG: IBT-AT series

FREQUENCY: 69 - 83 kHz
RANGE: To 1000 meters.
RESOLUTION: 16mg
SENSOR: 3 axis accelerometer

ULTRASONIC RECEIVERS

SONOTRONICS receivers offer superb performance for both active and passive systems, and provide optimum detection ranges when used with SONOTRONICS hydrophones and sonic tags.

NARROW BAND RECEIVER: USR-23

The USR-23 offers wide tuning range and narrow band reception ideal for use in noisy environments. Housed in a Pelican 1150 case, the USR-23 receiver is available with optional dual hydrophone inputs, and with internal memory and real-time-clock for unattended data logging. The two line LCD displays both frequency and interval, as well as ID and telemetry data.

FREQUENCY: 30 - 100kHz
OUTPUT: Headphone jack, optional data ports for data logging, GPS.
POWER: Internal rechargeable batteries with charger.
SIZE: 9.3”L. x 7.8”W x 4.5”D
INPUT: BNC connector (s).
SENSITIVITY: 10 uVolts for >35 dB (S+N)/N ratio.
DISPLAY: ***2 x 16 LCD.***

AVAILABLE OPTIONS:

The USR-23 may be ordered with 2 hydrophone inputs for greater flexibility.

MANUAL TRACKING KIT

The manual tracking kit consists of all the tools necessary for active tracking. These tools include:

- USR-23 narrow band, single input receiver
- DH-4 directional hydrophone
- Professional headphones
- External speaker
- EMT-01-1 test transmitter
- Pelican case
- DC and AC charge/power adapters

The internal battery pack will provide 7-8 hours of operation.

The MANTRAK-TH tracking kit contains a TH-2 omni-directional, towable hydrophone in addition to all the items listed above. This addition permits the greatest flexibility to perform active tracking of acoustic transmitters from multiple vendors.

NARROW BAND DIVE RECEIVER: UDR25

The Sonotronics Underwater Diver Receiver (UDR) allows a diver to locate and approach any object in a marine environment previously marked with a Sonotronics equipment marker transmitter (EMT), as well as other manufacturers' compatible pingers. The LCD may display frequency, interval, as well as ID and telemetry data, or signal strength

FREQUENCY: 30 - 83kHz
POWER: Internal rechargeable NiMH 9V batteries with charger.
SIZE: **(Approx)** 3"L x 3"W x 5"D (excluding handle)
SENSITIVITY: 20 uVolts for >35 dB (S+N)/N ratio.
DISPLAY: ***1 x 4 LCD.***
DEPTH RATING: ***100m***

UDR KIT

The UDR-kit contains all of the basic tools necessary for locating pingers from a surface vessel and while diving. This includes the UDR receiver, external hydrophone adapter, directional hydrophone and useful accessories, housed in a rugged Pelican case. Includes:

UDR25 Receiver
UDR25-BNC adapter
DH-4 Directional Hydrophone
EMT01-1 Test Transmitter
Waterproof Pelican Case
Underwater headphones

HYDROPHONES

SONOTRONICS hydrophones provide outstanding sensitivity, yielding excellent detection ranges when used with SONOTRONICS receivers.

DIRECTIONAL HYDROPHONE: DH-4

The DH-4 provides the greatest range and precision in locating transmitters from 30kHz to 100kHz. The parabolic reflector provide 16db of gain over a comparable omnidirectional hydrophone, and yields a calculated DI of nearly 25db, reducing the effect of environmental noise. The DH-4 is the primary hydrophone for active tracking.

SENSITIVITY: -184 db ref 1v/uPascal
BEAM WIDTH: +/-6 degrees at half power points.
SHAFT LENGTH: User supplies mounting shaft. (1.25 inch PVC)
OUTPUT: BNC connector on 10 foot coaxial cable (other lengths available).
CABLE: Replaceable RG-58 A/U

TOWED OMNI-DIRECTIONAL HYDROPHONE: TH-2

The TH-2 provides a simple method for mobile active tracking: its small size and hydrodynamic shape allows for trolling at speeds up to 5 knots, while the long cable length minimizes the affect of engine and prop noise. This design, though simple, rivals more elaborate and expensive systems in actual field trials.

. **SENSITIVITY:** -200 db ref 1v/uPascal
BEAM WIDTH: Omni-directional +/- 2 dB.
OUTPUT: BNC connector.
CABLE: 50' polyurethane jacketed coax

DIRECTIONAL HYDROPHONE: DH-5

The DH-5 offers directional capability in a small form factor, allowing precision in locating transmitters from 30kHz to 100kHz. The internal reflector provides 6db of gain over a comparable omnidirectional hydrophone, and yields a calculated DI of nearly12db, reducing the effect of environmental noise. The DH-5 is effective for tracking while wading in shallow water, or for low speed trolling.

SENSITIVITY: -194 dBV ref 1v/uPascal
BEAM WIDTH: +/-10 degrees
SHAFT LENGTH: User supplies mounting shaft. (1.25 inch PVC, body fits 2" PVC coupler)
OUTPUT: BNC connector on 10 foot coaxial cable (other lengths available).
CABLE: Replaceable RG-58 A/U

DIRECTIONAL HYDROPHONE: DH-ROV

The DH-ROV is a modified DH-5 hydrophone with a 50 meter polyurethane jacketed coax cable that may be wrapped together with an ROV tether and connect to a topside receiver via a BNC connector.

SENSITIVITY: -194 dBV ref 1v/uPascal
BEAM WIDTH: +/-10 degrees
OUTPUT: BNC connector.
CABLE: 50m polyurethane jacketed coax
DEPTH: 80m maximum.

*mini*SURT: *miniature* Submersible Ultrasonic Receiver/Transmitter

The miniSURT is a submersible receiver designed to detect and log to flash memory the presence of an animal tagged with a Sonotronics ultrasonic transmitter. The miniSURT contains an integrated hydrophone, transmitter, flash memory, and BlueTooth Low Energy transceiver for configuration and data downloads. The miniSURT uses a single Lithium AA battery for simplified deployments.

FREQUENCY: 69 - 83 kHz, user configurable
POWER: AA lithium battery, user replaceable
LIFETIME: 2.5 month typical.
SIZE: 14.5cm length, 32.5mm diameter
WEIGHT: 132g (with batteries installed), negative buoyant in water
INPUT: Onboard hydrophone; BLE radio for data connection .
MEMORY: 1MByte standard (100000 + detections)

SUR-22(BLE): Submersible Ultrasonic Receiver

The SUR-22 is a submersible receiver designed to detect and log to flash memory the presence of an animal tagged with a Sonotronics ultrasonic transmitter. The SUR contains an integrated hydrophone, flash memory, and transponding feature, allowing the user to interrogate the unit from a distance and determine presence/absence of data in the unit.

FREQUENCY: 30 - 90 kHz, Programmable
POWER: 1 or 2 Lithium D Cell Batteries (SUR contains 2 D cell sockets)
LIFETIME: 10 months typical with 2 D cells.
SIZE: 36cm length, 6.1cm diameter
WEIGHT: 900g (with 2 D cells installed), positive buoyant in water
INPUT: Onboard hydrophone, RS232 or BlueTooth Low Energy (BLE) data connection.
MEMORY: 2MByte standard (200000 + detections)

SURBATT: Replacement Tadiran TL-5930 battery for SUR's

MISCELLANEOUS INFORMATION

YOUTUBE VIDEOS

A video is available for our customers on Surgical Techniques for Insertion of Ultrasonic Transmitters in fish as well as other short instructive videos on the use of Sonotronics equipment. (search for "Sonotronics" or access these from the "RESOURCES" tab at www.sonotronics.com)

WEIGHTS/SIZES/RANGES/LIFETIMES

Weights of tags are in water. Ranges are in deep sea water at sea state zero. Assumes no temperature stratification. Sizes are to the closest 0.5 mm. Lifetimes are based on actual measured current consumption of individual tags, along with battery manufacture's *published* capacity ratings. SONOTRONICS does not test or guarantee these published specifications. Note that there is a small current drain when transmitters are "asleep" with their magnets on. In some cases this can significantly reduce life when tags are shelved for periods of time before the study. Please contact SONOTRONICS for more information about the particular model of transmitter. Lifetimes of transmitters are based upon a pulse repetition rate (pulse interval) of one pulse per second.

STANDARD CRYSTAL FREQUENCIES

34 to 40.0 and 69.0 to 83.0 kHz in 1 kHz increments.

ATTACHMENT HOLE SIZE

Standard is 1/16". Other sizes available for a nominal charge. Any deviation in product specifications must be included on your order.

TOLERANCE

Tolerance for tag length is ± 3%.
Tolerance for tag weight is ± 10%.

ON SITE ASSISTANCE/ON SITE SURVEYS

Sonotronics provides on site assistance and surveys. This can help a project launch with more speed and ease by providing first hand explanation and demonstration into the installation and use of Sonotronics systems, and the art of tracking. Sonotronics requires 30 days notice for consideration of on site assistance.

WARRANTY

Sonotronics warrants its products for 12 months from the time of shipment. A detailed warranty statement may be found under the "RESOURCES" tab at www.sonotronics.com.

Equipment Marker Products:

EQUIPMENT MARKER PRODUCTS

The Sonotronics Equipment Marker product line allows for the relocation of an object previously marked with a pinger in a variety of marine environments. Equipment can include submersibles, water monitoring equipment, divers, or virtually any other underwater object. Applications can include military, ocean oil drilling operations, surveying, fisheries, and many others. There are three simple steps to the implementation of the system:

1. Marking the target with a pinger: The pinger is attached to the object prior to deployment via convenient mounting holes. Pingers are activated at the time of deployment, and then are deactivated when the object returns to the boat, allowing for longer battery lifetimes.

2. Location of vicinity and dive direction: The deck unit receiver is used to determine that the object is still in the vicinity, and appropriate direction to begin the dive.

3. Approach to the target using the Underwater Diver Receiver: The diver then enters the water wearing waterproof headphones, listening to the strength of the transmissions from the pinger. Gain control and signal strength indication allows for accurate bearing as the diver approaches the object. The UDR may be programmed to scan several frequencies, allowing for many pingers to be tracked.

4. Approach to the target using the DH-ROV: In deep or dangerous waters, a tethered ROV may be outfitted with the DH-ROV to provide real-time detection data to aid in the relocation of tagged equipment. The DH-ROV is a directional hydrophone providing a top-side operator detection indications of an EMT transmitter.

EQUIPMENT MARKER PINGERS: EMT Series

These pingers are designed and packaged specifically for the purpose of marking equipment for later recovery.

FREQUENCY: 34 - 40, 69 - 83 kHz
RANGE: 1km to 4km

EMT-01-1: 48 month, medium range transmitter (1km)
EMT-01-2: 18 month, Higher power transmitter (3km)
EMT-01-3: Extreme high power transmitter (4km), with user replaceable batteries. Various lifetime and power output combinations available. Please see EMT-01 data sheet.
EMT-01-5: 18 month, Higher power, low frequency transmitter (3km)

UDR25: UNDERWATER DIVER RECEIVER:

The UDR is a handheld diver operated receiver with waterproof headphones in pelican case. The unit will detect any Sonotronics transmitter and is used for a wide variety of applications. These applications include up close monitoring of animal habitat and behavior, recovery of tagged equipment, and many others. The unit uses audio signal strength in the headphones as the primary detection scheme.

FREQUENCY: Programmable: 30 to 83 kHz
DISPLAY: LCD: displays frequency and pulse interval.
SENSITIVITY: 20uVolts for 30 dB (S+N)/N
WEIGHT(in air) : UDR:500g Headphones:415g
POWER: Internal rechargeable battery with charger.
BATTERY LIFE: 10 Hours**,** recharge time 8 hours.

DECK UNIT (USR-23) RECEIVER:

The USR-23 Receiver is used to find tagged equipment from the deck of a boat. Using a directional hydrophone the operator can determine the direction of the marked equipment. The MANTRAK kit consists of the USR-23, DH-4 directional hydrophone and useful accessories in a pelican case.

PRICE LIST

MODEL	Length	OD	WT in H_20 gms	Range[1]	Autonomy[2]	Price
Coded High Powered Transmitters						
CHP-87-S	54mm	15.6mm	9g	To 3km	7 months	$375
CHP-87-L	80mm	15.6mm	12g	To 3km	18 months	$375
CHP-87-XL	99mm	33.5mm	34g	To 3km	4 years	$450
Coded Transmitters						
CT-82-1-I/E	38/49mm	15.6mm	6g	To 1km	60 days	$195
CT-82-2-I/E	53/54mm	15.6mm	9.5g	To 1km	14 months	$255
CT-05-36-I/E	63/64mm	15.6mm	10g	To 1km	36 months	$350
CT-05-48-I/E	79/80mm	15.6mm	12g	To 1km	48 months	$350
Coded Temperature Transmitters						
CTT-83-2-I/E	53mm	15.6mm	9g	To 1km	14 months	$295
CTT-83-3-I/E	63mm	15.6mm	10g	To 1km	36 months	$355
Depth Telemetry Transmitters						
DT-97-L	66mm	15.6mm	11g	To 3km	12 months	$450
Activity Transmitters						
AT-82-2-I/E	53/54mm	15.6mm	9.5g	To 1km	24 months	$450
Echosounder Transceivers						
XP-500	55mm	11mm	5g	100m	24 months	$425

NOTES:
[1]Quoted ranges are under good conditions using a USR-23 receiver and a DH-4 hydrophone, and pertain to audio detection as opposed to automated detection..
[2]Continuous operation lifetime.

PRICE LIST (continued)

TAG MODEL	Length	OD	WT in H_20	Range	Autonomy	Price
Miniature Transmitters (Itty-Bitty)						
IBT-96-1	22/30mm	8mm	1.4g	750m+	21 days	$335
IBT-96-2	25/33mm	9.5mm	2.5g	750m+	60 days	$335
IBT-96-6-I/E	42/45mm	11mm	3.9g	750m+	8 months	$335
IBT-96-9-I/E	47/50mm	11mm	4g	750m+	9 months	$335
PicoTags (sub-miniature)						
PT-1	15mm	7.1mm	.6g	500m+	7 days	$360
PT-2	18mm	7.1mm	1g	500m+	12 days	$360
PT-3	18mm	7.8mm	1g	750m+	21 days	$360
PT-4	24mm	9.0mm	2.3g	750m+	90 days	$360
Miniature Temperature Sensing Transmitters						
IBTT-08-9-I/E	40/43mm	11mm	4.2/5.2	750m+	9 months	$375
PTT-2	18mm	7.1mm	1.2	750m+	12 days	$375
PTT-3	18mm	7.8mm	1.2	750m+	21 days	$375
Miniature Depth Telemetry Transmitters						
IBDT-97-1	25mm	9.5mm	1.6g	500m+	20 days	$450
IBDT-97-2	34mm	9.5mm	2.5g	500m+	45 days	$450
IBDT-96-9	52mm	11mm	4.5g	750m+	9 months	$450
Miniature Activity Tags						
IBT-AT-6-I/E	42/45mm	11mm	3.9g	750m+	12 months	$425

PRICE LIST (continued)

Fisheries Research Products Price List—Receivers		
MODEL	**Description**	**Price**
Active Receivers and Related Products		
USR-23	Active tracking receiver, Pelican case	$2800
USR-23-DL	Active tracking and data logging receiver, Pelican case, Dual input	$3250
MANTRAK	Manual Tracking Kit (contains USR-23, DH-4, and accessories)	$4200
UDR Related Products		
UDR25	Underwater Diver Receiver, Headphones, Case	$4100
UDR-HP	UDR underwater headphone	$350
UDR-BP	UDR Bonephone (bone conduction speaker, fits inside wetsuit hood)	$400
Passive receivers and Related Products		
miniSURT	Miniature Submersible receiver with Bluetooth Low Energy Communications	$895
SUR-22	Submersible ultrasonic receiver (1-9 unit price)	$1550
SUR-22-BLE	Submersible ultrasonic receiver, BlueTooth interface (1-9 unit price)	$1500
SIT-1	SUR interrogator transmitter (interrogates SUR for presence/absence of data)	$300
SUR-BATT	SUR Replacement Battery	$50
Cable-USBRS232-5.0	Serial (IKELITE) to USB Cable	$100
Hydrophones		
DH-4	Directional hydrophone, with 10 ft coax ($1/ft for lengths > 10ft)	$750
TH-2	Towed Omni-directional hydrophone, with 50 ft coax	$500
DH-5	Small Directional hydrophone with 10 ft coax ($1/ft for lengths > 10ft)	$575
DH-ROV	ROV Mountable Directional hydrophone with 50m coax	$750
Other		
HPR-95 Amp	Audio Amplifier	$400
PGH	Professional Grade Headphones	$200

Instrument Marking/Oceanographic Products:						
Equipment Marker Transmitters (Weights in Air)						
EMT-01-1	99mm	19mm	40g	To 1km	48 months	$375
EMT-01-2	99mm	19mm	40g	To 3km	18 months	$425
EMT-01-3	201mm	32mm	223g	[1]To 4km	[1]Up to 6 months	$675
EMT-01-3IAL ** Immersion activation	201mm	32mm	223g	[1]To 4km	[1]Up to 6 months	$795
EMT-01-5	136mm	32mm	179g	To 3km	18 months	$595
Tilt Angle Monitoring Transmitters (Weights in Air)						
EMT-AR-1	99mm	19mm	39g	To 1km	48 months	$485
EMT-AR-2	99mm	19mm	39g	To 3km	18 months	$545
EMT-AR-3	201mm	32mm	223g	[1]To 4km	[1]Up to 6 months	$750
UDR-kit	Deck/Diver receiver Kit (contains UDR, UDR-BNC, DH-4, and accessories)					$4850
MANTRAK	Manual Tracking Kit (contains USR-23, DH-4, and accessories)					$4200
MANTRAK-TH	MANTRAK kit with TH-2 omni-directional, towable, hydrophone					$4600
MANTRAK-TT	MANTRAK kit with 2x EMT-AR-1 tilt pingers					$4700
UDR Related Products	**UDR Related Products**					
UDR25	Underwater Diver Receiver, Headphones, Case					$4100
UDR-BNC	UDR BNC adapter for use with separate hydrophone					$250
UDR-HP	UDR headphones					$350
UDR-BP	UDR Bonephone (bone conduction speaker for inside wetsuit hood)					$400
ROV Related Products	**ROV Hydrophone**					
DH-ROV	ROV Mountable Directional hydrophone with 50m coax					$2625

PRICE LIST NOTES:

[1] Depends on battery configuration.

- Internal implant version or external mount version must be specified when ordering with an “I” or an “E” accordingly at the end of the model number. Transmitters with the “E” suffix will have a small drill hole at each end of the transmitter to aid in external mounting. Transmitters with the “I” suffix will have a round end on one end to aid in insertion during surgery. Changing the transmitter packaging may result in a change in dimensions.
- The transmitters mentioned in this catalog are a set of SONOTRONICS standards. Custom lifetimes, sizes, and ranges are possible-contact the factory for details.
- Prices are in U.S. dollars
- Autonomies are based upon 1 15ms ping per second. Faster ping rates may cause a shortening of tag lifetime.
- Achievable ranges are based upon the particular pingers output detected by a Sonotronics USR-08 receiver and DH-4 hydrophone combination, under ideal sea conditions.
- There is a small battery drain while transmitters are "asleep" with their magnets on them. This drain may be negligible in long life transmitters, but on short lifetime transmitters can reduce their remaining lifetime by 25% per 3 months, or more. If transmitters are to be stored for any period of time greater than 1 month before deployment, it is recommended that the user contact Sonotronics for battery loss information.

CHOOSING THE RIGHT SYSTEM

A tag, receiver and hydrophone form the basic system. The **MANTRAK Kit** includes high-quality headphones, an external speaker, a watertight Pelican case, a sample transmitter, and other accessories intended to facilitate ease in tracking. This is the Sonotronics recommended solution for active tracking.

RECEIVERS

There are two fundamental types of tracking using ultrasonic transmitters, active tracking and passive tracking.

Active tracking: Real-time tracking ultrasonic receiver to locate and identify specific animals or equipment tagged with an ultrasonic transmitter, also allowing in-situ telemetry data collection. The USR-23 narrow band receiver and DH-4 directional hydrophone is the system of choice for manual tracking. When traversing large areas, the TH-2 towed hydrophone can significantly reduce the amount of time and labor during active tracking sessions.

Diver Receiver tracking: A specific case of active tracking, use of the UDR underwater diver receiver aids monitoring fish in their microhabitat, recovery of lost transmitters, and is often used to recover equipment marked with a transmitter. With fine gain control and signal strength display, divers can often find equipment even in very poor visibility.

Passive tracking: Passive tracking involves using an automated receiver, typically the SUR submersible ultrasonic receiver, to detect and record tagged animals that pass within its detection range. Typically, these systems are deployed for extended periods of time (months) allowing for continuous tracking with minimal labor.

TRANSMITTERS

Transmitters are defined by 3 quantities: size, life and range. For animal tracking, size is limited by the weight and body geometry: generally transmitter weight in water must be < 2% of body weight. The decision on whether or not to implant usually is a function of the life-time of the study. As a general rule, a study lasting more than 3 months should consider surgical implants unless external retention methods are proven.

HYDROPHONES

Model DH-4 is the best all around hydrophone for active tracking: its narrow cone of reception gives optimum range and precision of location. A scan of the four quadrants for signal strength will provide a quick bearing, and a bit of patience can produce a precise bearing (within 10 degrees). The model TH-2 omni-directional hydrophone detect equally well in all directions, and is suitable for towing at speeds up to 5 knots. The DH-5 is suitable for low speed trolling and for use while wading in shallow water, offering directional capability and modest passive gain.

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