All habitats
Radio

Biotracker

Waterproof, wide-band radio receiver

- Waterproof & dust-tight
- Up to 30 MHz frequency band (within 138-174 MHz)
- Small, light & tough
- 256 user-programmable channels
- Scanning function
- Frequency table upload from a PC

Features at a glance

Frequency Band	▪ The receiver covers an 8 or 30 MHz band on frequencies between 138.000 and 174 MHz ▪ Fine tuning in 1kHz or 0.1kHz steps
Functions and Controls	▪ Direct frequency entry from the membrane keypad (no need to enter MHz part of frequency each time a frequency is set) ▪ 256 user-programmable channels ▪ Scanning of all or selected channels (scan interval 1 to 999 s, settable to 1 s resolution) ▪ Internal speaker ▪ Headphones socket (switches out internal speaker) ▪ LCD Back-light (automatic switch-off after 4 minutes) ▪ Dual gain control (keypad buttons and knob) ▪ Control of frequency, channel & gain from a PC serial port (RS232) ▪ Bar chart and numerical display of signal strength
Environmental Specification	▪ *Fully water-proof* (to IP65) ▪ *Operating temperature range:* –20 to +50°C (battery charging temperature range: 5 to 35°C) ▪ *Temperature stability:* +/- 1 kHz over –20 to + 50°C
Electrical & Mechanical Specification	▪ *Minimum Discernible Signal:* -150 dBm over entire frequency band ▪ *Gain Control Range:* 90 dB ▪ *Power supply:* internal battery pack, external power supply (DC, 10.5-15V, >500 mA) or four internal rechargeable or primary (non-rechargeable) AA cells. ▪ *Battery Life:* 28 hours on internal NiMH battery pack ▪ *Weight:* 800g including strap and battery ▪ *Size:* 150 x 85 x 55 mm (6 x 3.25 x 2 inches)
Standard Accessories	▪ User manual ▪ Frequency upload software (running on a PC) ▪ RS232 cable and RS232 - USB converter ▪ International mains power supply (for charging internal battery) ▪ Car 12V power lead (for charging from a car) ▪ Headphones ▪ Battery holder for AA cells ▪ Spare connector covers and battery compartment screws

Biotracker

Full Specifications & Details

This page lists specifications, their values and explains what they mean and why they are important in practical terms for animal radio-tracking. Sentences in *italics* are the key ways in which you should judge receiver performance.

Frequency Bands: 8 or 30 MHz bands between 138 & 174 MHz
Most tracking receivers cover a 1-2 MHz band only. Biotracker can cover up to 30 MHz! If such a wide band is not required there is a version with an 8 MHz band (that costs less). Receivers with the narrower band can be upgraded. The main benefits of the 30 MHz band version are: *Biotracker can be used almost anywhere & Biotracker is 'future-proof' against changes in frequency allocation*

Sensitivity: MDS -150 dBm
The more sensitive a receiver, the better the chances of you hearing very weak signals. MDS means 'Minimum Discernible Signal' and is the weakest signal that can be heard on the receiver. *The more negative the MDS, the better the sensitivity (e.g. –150 is better than –145).*

Selectivity: 6 dB: ± 2 kHz 60 dB: ± 4 kHz
The more selective the receiver, the less chance you will hear 'interference' from adjacent frequencies (including radio tags and signals from other radio users). However, beware selectivity that is too narrow (e.g. < ±1 kHz at 6dB). This will make tuning more critical and increases the risk of missing a transmitter that has shifted frequency slightly (e.g. due to a change in temperature).

Gain Control Range: Receiver gain 90 dB
When tracking powerful tags at close range you have to be able to reduce the gain to very low levels, otherwise the signal will no longer appear to be directional. *The greater the Gain Control Range, the less likely you are to encounter problems with close range tracking.* Receivers with inadequate gain control range need attenuator switches.

Channels: Number of channels (user programmable): 256
Having channels makes the receiver easier to use in the field and enables memory scanning for lost animals. Two-digit numbers (up to 99 animals) are easier to remember than 3, 4 or 5 digit frequencies. Also, if you routinely track animals in a particular sequence, you can arrange the channel order to match this. One press of the channel 'up' key then selects the frequency of the next animal.

Scanning: Minimum scan interval: 1 second Maximum scan interval: 999 secs (16 mins and 39 seconds)
The Scanning function steps through the channels on your receiver and stops on each one for a predefined interval. You can set the scan interval and select which channels are to be included in the scan. *Scanning automates the process of frequency changing when searching for a number of tags at once.* It is especially useful during searches from vehicles (including aircraft).

Weight: 800g
The lighter the receiver the easier it will be to carry in the field. However, bear in mind that the battery contributes extra weight but that heavier batteries last longer. There is inevitably some compromise here. Also, receivers in lighter, plastic cases may not be as robust as those in metal cases.

Size: 150 x 85 x 55 mm / 6 x 3.25 x 2 inches
The smaller the receiver the easier it will be to carry in the field. However, consider carefully how the receiver is to be used. Will you need to use it with gloves on ? Small receivers usually have small controls that may be difficult to use, especially with gloves, or the controls may not be in the optimum position for operation with one hand while holding a Yagi with the other. Biotracker was designed with these factors in mind.

Waterproofing: Method: Neoprene & silicone seals. Rating: IP65
The waterproof rating code 'IP65' is from a standard dust and water resistance scale. It means the device is dust-tight and impenetrable to water spray from all directions. Biotracker has a waterproof seal on box lid and battery compartment. The speaker is fully covered by the membrane keypad and the gain control is hermetically sealed. All connectors are sealed on inside of box and external covers are supplied for connectors when not in use. *Water-proofing to IP65 is an essential feature of any modern radio-tracking receiver.*

Frequency Stability: Over –20 to +50 C: < 2.5 kHz. Over time: < 1 kHz in first year (slower change thereafter)
If a receiver frequency changes with temperature there is a chance that you will miss tags because the receiver is no longer tuned to the best frequency on which to hear them. This is more likely to be problematic if your study area is prone to large swings in temperature, or if you are tracking in a very cold climate and have tuned into your tags indoors in the warm. In practice, a change of +/- 1 kHz does not cause much of a problem, provided you are aware of it. Remember that tags too are likely to change frequency with temperature. *The more stable the frequency of the receiver over temperature and time, the less the risk you will miss a tag because of frequency shift.*

Tuning: N/A
The receiver can be tuned in 100 Hz (0.1 kHz) or 1 kHz steps. The fine tune (0.1 kHz) is good for selecting the sound (pitch) you find most comfortable to listen to. The 1 kHz tuning resolution allows faster frequency stepping using the arrow keys.

Battery life:
Rechargeable NiMH battery pack (4 x 'A' NiMH cells): 28 hours
Primary alkaline 'AA' cells: 26 hours
NiMH 'AA' Rechargeable cells: 20 hours
NiCad 'AA' Rechargeable cells (not recommended): 10 hours
Long battery life reduces both running costs and the risk that the receiver will stop working in the middle of fieldwork. A receiver designer's choice of battery involves a compromise between size (weight) and battery life. Batteries that last longer will also be heavier. Primary cells are 'ordinary' non-rechargeable batteries (we recommend high grade alkaline cells). We suggest using primary cells only if you have no local facility for recharging. Rechargeable cells are more expensive to buy, but more cost-effective in the long run. We strongly recommend the Nickel Metal-Hydride battery pack supplied with each receiver because it contains higher capacity 'A'-size cells, and will not suffer from the over-charging/memory effects of NiCads.

External power supplies: 10.5 – 15 V
The receiver can be powered from an external battery (e.g. car cigarette lighter). The internal battery is recharged via the same socket. *Powering a receiver from an external power supply saves internal battery life and allows the receiver to run from a vehicle or for long periods with a data logger.*

Back-light on LCD: On-time: 256 secs (4.3 mins)
This is for using the receiver at night. It can be switched on and off using a single key, and it switches off automatically after about 4 minutes.

Frequency table upload software:
Enables lists of frequencies to be uploaded from a PC to Biotracker channels. For large numbers of tags it is easier to enter the frequencies in a spreadsheet and load them into the receiver than to enter them individually from the receiver keyboard.

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FISH & WILDLIFE MONITORING
Innovative solutions for a sustainable future.

Tel: 905-836-6680
Fax: 905-836-6455

Web: www.lotek.com
Email: biotelemetry@lotek.com