

NAT Device

Wireless Recordings in Rodents

Cat. No. 55100

General

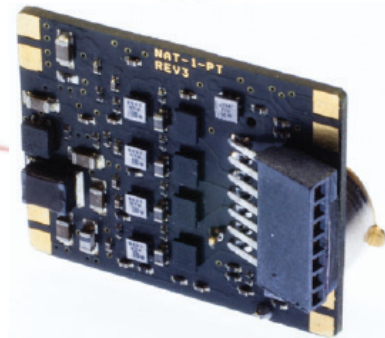
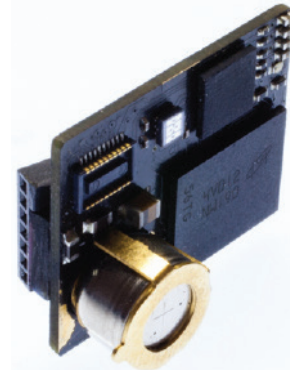
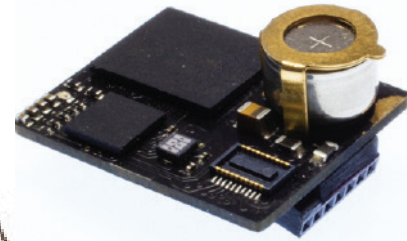
Biosignal data acquisition & recording is becoming increasingly important in many applications, such as Biomedical and Neuroscience.

The use of devices to record **EEG** (Electroencephalography) is of particular interest. Traditionally, these measurements are taken with tethered devices in the clinic, are short lasting and conducted in artificial settings.

The ability to perform ambulatory monitoring of subjects provides the possibility of long-term data capture of bio-parameters in a normal living-condition or work-place. This has been an aim for many decades. In animals, these are difficult to reproduce and freely moving rodents/mammals are spatially limited to small arenas.

The "NAT" (**Neural Activity Tracker**) is a multi-purpose data sensing and recording device that is extremely small, lightweight, and enables data acquisition for days to weeks, dependent upon programmable settings.

The NAT is a versatile and very compact device and its use for EEG and sleep studies, local field potential recording and behaviorally relevant event-related brain activity is proven.



Miniaturized & Lightweight

No Wires - No Antennas

Ideal for Mice

**WIRELESS
EEG & LFP
RECORDING**

Main Features

- Weight 2.2g , 18mm x 23mm, ideal for small rodents, including mice
- Power delivery: +24 hours on-board battery
- 4 channels, 1kHz SA/s, 12 bit resolution
- Wireless (flash memory), no antenna
- 3-axis accelerometer & IR time stamping
- Data Download Software included
- Custom features available on request, including 8Gb Memory, higher sample rates and custom add-on boards

General

The NAT (Neural Activity Tracker) is a 4-Channel, wireless, 1Ksa/sec Biosignal Data Recorder with 3-D Accelerometer and Infra-red Time/Event stamp Function.

It's **miniaturized size, 18x22mm**, less than 10mm in height (primarily due to the battery module, as the major part of the device has a profile of less than 4mm), and light weight, less than **2.2grams**, makes it attractive in applications where regulatory constraints apply (mice).

The NAT device comprises of 3 key components – an on board flash memory, a proprietary CPU and a proprietary MEMS (MicroElectroMechanical System) device for accelerometer. An optional infra-red time/event-code recording board can be easily added to the device to allow alignment of behavioral events with the EEG recording.

The NAT's main features are:

Hardware:

- Robustness and reliability
- On-board clock (calibration/synchronisation with ext devices)
- Reliable battery fitting (zinc-air cell)
- Large 4GB memory (optional 8GB)
- Programmable sample frequency
- Advanced accelerometer for 3D movement detection
- Infra-red Time/Eventstamp Function (optional)
- On-board functionality indicator (LED)
- Programmable start function for delayed onset
- Recording of 2x2 channels via independent ground
- Refreshable memory
- Programmable AC input range p to +/-3.75mV; band pass filter 0.3-500Hz

Data handling & analysis:

- Connector compatible with USB2 for download
- Accelerated data download (single/multi-device docking station)
- Easy data transfer (to Excel or similar), multiple/flexible data formats (incl. txt and csv format)
- Link to existing data analysis software

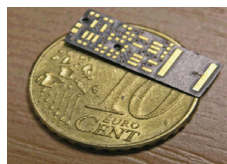
Battery

A specially designed gold-plated metal holder houses a single zinc-air cell: such cells are widely used in hearing aids, hence commercially available and easily replaced by the user. These batteries have an active power-delivery life-span up to two weeks allowing for long-duration continuous power.

Battery replacement is easy and can be done by the user!

Optional I.R. Data-Coder

This extremely small add-on allows recording of an infrared pulse code along-side the analogue channels and accelerometer.



Docking Station & Data Handling

The NAT device is provided with a single-channel docking station, including software, for download of data from flash via USB. A multiple docking station will soon be available. Once downloaded, the data are available for further processing in .txt, .csv and edf standard!

Help and Advice

Thanks to the cooperation with the University of Aberdeen, via multidisciplinary expertise we are available to provide user-defined solutions for electrophysiological applications, including:

- Neuroscience / Behaviour / Electrophysiology
- Experimental (disease) models
- Surgical procedures
- Equipment validation
- Data Analysis

Ordering Information

- 55103** NAT Device
- 55104** Optional IR Module
- 55101** Docking Station, including **55100-010 Data Download Software**

Multiple System packs are also available

Accessories

We offer accessories for EEG implantation and recording as additional package of support, including screws, wire, connectors, dummies, batteries.

Specs.

Parameter	Limits	Units
Analogue inputs	4	channels
Bits per channel recorded	12	bits
Accelerometer	3	Axis
Bits per Accel. Axis	8	bits
Sample rate (max)	1000	Sa/Sec x 4 ch
Data Capacity	4 or 8	Gbits
Recording Time	72 hours at 250Sa/s 48 hours at 500Sa/s 18 hours at 1000Sa/s	
Analogue Resolution	0.5µV	
Select. Analogue mV range	+/- 0.75, +/-1.75, +/-3.75	
Accelerometer range	Selectable	G (G-force) 2 or 8
Accelerometer sensitivity	18 72	mG at 2G range mG at 8G range

Physical

Dimensions	: 18x22x10(h)mm
Weight	: <2.2grams including battery
Warranty	: 24 months

Bibliography

- "On the identification of sleep stages in mouse electroencephalography time-series" J. Neurosc. Methods, Mar 2015 <https://doi.org/10.1016/j.jneumeth.2015.03.007>
- "Evaluating a Miniature Multisensor Biosignal Recorder for Unsupervised Parkinson's Disease Monitoring" Sensors & Transducers, 184:1, Jan 2015
- "Detection of time-, frequency- and direction-resolved communication within brain networks" Nature Scientific Reports, Jan 2018. <https://doi.org/10.1038/s41598-018-19707-1>