NAT-1 4G/8G

SELF-POWERED WIRLESS 4-CHANNEL SIGNAL TRACKER WITH ACCELEROMETER

Features

- Four high impedance low voltage input channels particularly suitable for rodent EEG recordings
- Individually programmable channel input range selectable from +/- 1, 2 and 4 mV
- Programmable sample rates from 50 Sa/s to 2000 Sa/s
- Recording directly to on-board non-volatile memory
- ‘Live’ embedded software filtering option to reduce signal acquisition aliasing
- 3-axis MEMS accelerometer with programmable +/- 2 g and 8 g ranges
- Expansion socket for additional ‘add-on’ capability
- Status indicator LED
- Powered from single hearing aid type battery
- Multi-day recording durations, depending on programmed sample rate
- Light weight < 2.2 grams
- Small footprint < 4 cm²

Applications

Wireless animal EEG/EMG recording
Remote tremor/vibration monitoring

Description

The NAT-1 is a miniature light-weight wireless device for recording low amplitude voltage signals from high impedance sources. It is ideally suitable for recording multi-channel EEG signals from small rodent animals such as mice and rats. In addition to recording voltage signals the NAT-1 also simultaneously stores 3-axis accelerometer/tilt data via its on-board MEMS sensor.

Four voltage signal input channels are available through a 7-way connector positioned at the edge of the device. These channels are grouped into two pairs; each pair has a separate voltage reference input, enabling the use of different types of electrode metals (Gold, Steel etc.) per pair.

The input voltage range of each channel is programmable before use. Ranges of +/- 1, 2 and 4 mV are offered.

The bandwidth of the four input channels is band-pass limited between 0.3 Hz - 500 Hz (-6dB). To reduce aliasing noise when sampling at low sample rates an optional on-board active filter is available and enabled during the setup/programming phase.

The on-board MEMS sensor has two accelerometer G ranges available of +/- 2 g and 8 g. The required range is configured during the setup phase.

Ordering

NAT-1-4G – NAT-1 device with 4Gb flash memory
NAT-1-8G – NAT-1 device with 8Gb flash memory

Available Add-On Boards

NAT-1-IRDB - Infra-red Detector Board
Specification (note: details subject to change)

Power Source: Single Zinc-Air Type 13 Battery (Recommended Duracell EasyTab 13 - pack DA13N6)
Battery Life (Operating): > 24 hours
Battery Life (Shut-Down Mode): > 200 hours

Analogue Input:
- No. of Input Channels: 4
- No. of Reference Inputs: 2
- Input Voltage Ranges:
  - (+/- 1 mV)
  - (+/- 2 mV)
  - (+/- 4 mV)
- Input DC Offset Rejection:
  - (+/- 20 mV d.c. max, referenced to REFA/REFB)
  - (+/- 100 mV d.c. max, common-mode (referenced to GND))
- Input Impedance: > 1 GΩ (between input channel and REFA/REFB)
- Input Bias Current: 1 pA (typ)
- Channel Bandwidth (-6 dB): 0.3 Hz to 500 Hz
- Channel LF Stop-Band Attenuation: 20 dB/Decade
- Channel HF Stop-Band Attenuation: 40 dB/Decade
- Channel/REF pair CMRR: 94 dB
- Channel S/N Ratio: 54 dB (min)

Maximum Sample Rate: 2000 Sa/s (all channels)
Minimum Sample Rate: 50 Sa/s (all channels)

Max Recording Times (NAT1-4G):
- 250 Sa/s: 72 hours
- 500 Sa/s: 36 hours
- 1k Sa/s: 18 hours
- 2k Sa/s: 9 hours

Accelerometer
- Sensitivity: +/- 18 mg @ 2 g range
- Bandwidth: 80 Hz max

Feature Expansion (infrared, RF etc): Via plug-in add-on IO Board

Host Interface: USB Docking Station (NAT-DS1)

Size: 18.0 mm x 22.2 mm (including connector)
Height: 10.3 mm
Total Weight: 2.2 g (with battery fitted)
Operating Temperature: 5 °C to 45 °C
Storage Temperature: -10 °C to 70 °C
Relative Humidity: 20 % to 80 %