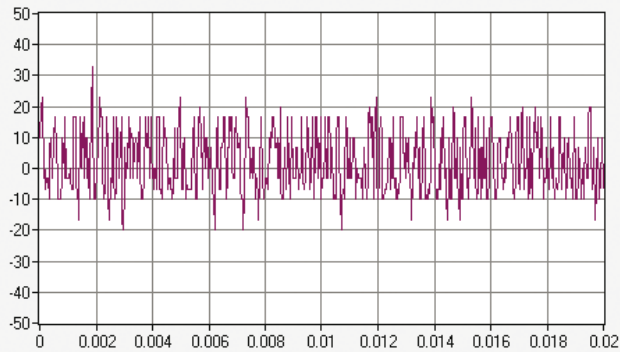
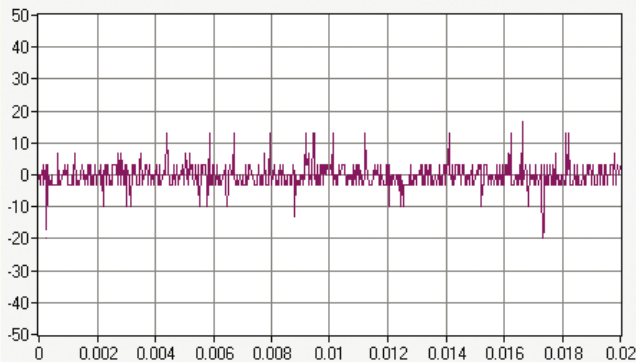


Recorded noise performance



Above is a short section of a recording of a single channel connected to a 500K Ω resistor. The Y-axis is in μ V, the time axis is in seconds. The measured noise was 55 μ V p-p (6σ , 10^6 points) The theoretical Johnson noise of the resistor alone is 45 μ V p-p (6σ). Below is a similar recording made using a 10K Ω resistor. This demonstrates that the noise is determined by the electrode impedance, not the logger's electronics. One advantage of a small wireless logger is the intrinsic insensitivity to 50/60Hz line frequency interference.



Complete Kits

MouseLog-16 is supplied as part of a complete kit. Typically a kit will contain four neural logger boards, two radio transmitters, two synchronizing transceivers, two accessories for downloading and charging, one signal test accessory, the full software suite and all the cables, antennas and documentation needed.

Synchronizing Transceiver

- ▶ All input and output events can be recorded with timestamp on neural logger
- ▶ Accurate timing independent of host computer's latency
- ▶ Four BNC connectors for digital inputs
- ▶ Programmable pulse train outputs
- ▶ IRIG time signal outputs
- ▶ Optional GPS receiver
- ▶ Optional analog inputs and outputs
- ▶ Custom versions can be quickly configured



About Deuteron Technologies

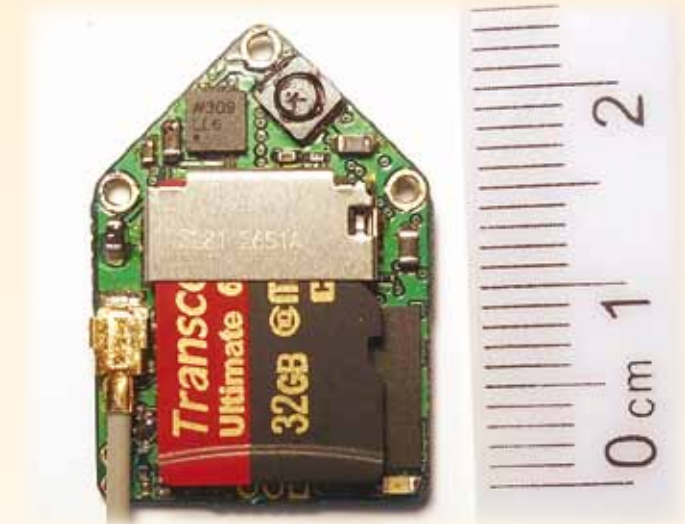
Deuteron Technologies Ltd is a company located in Jerusalem, Israel that is now dedicated to developing and producing ultra-small electronic instrumentation for electrophysiology experiments on freely moving animals. Previously, it made a variety of custom analog-based electronic instruments. In 2010 it produced its first wireless programmable stimulus generator for rats. In 2012, this 8-gram circuit was miniaturized to 1 gram. Development of wireless neural recording equipment started in 2012. The first research results that utilized Deuteron's 6-gram neural recording and stimulation system for bats were published in 2013.

Deuteron continues to decrease the size, add features and improve the performance of its growing range of wireless neural recording and stimulation systems. Deuteron has primarily developed products to serve the needs of laboratories in Israel. Following the Society for Neuroscience conference in November 2014, Deuteron's products will be offered to the global neuroscience research community.

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Deuteron Technologies Ltd *Electronics for Neuroscience*



MouseLog-16

Wireless 16-channel neural data logger for small animals

- ▶ Made for single-unit recording
- ▶ 1.6g including memory card
- ▶ 29.3K samples per second
- ▶ Data stored on a Micro-SD card
- ▶ Wireless preview of data
- ▶ Synchronization with lab events

MouseLog-16

Mouselog-16 is a lightweight wirelessly controlled neural data recorder designed for neuroscience experimentation with small, freely moving animals such as mice, bats and birds. It has 16 input channels and weighs just 1.6 grams

Neural recording

The 16 neural input signals channels are each amplified relative to a selectable reference input, digitized at 29.3Ks/s and continuously recorded on a MicroSD memory card.

Real time monitor over radio link

Neural signals can be viewed on a computer screen using the radio link.

Guaranteed data integrity

Storing data on an animal-borne memory card ensures that the recorded data is never interrupted and always free of artifacts even if the animal moves out of the range of radio communication

Synchronization

Many synchronization options are provided to ensure that the time scale of the recorded data is perfectly correlated with events on other laboratory equipment. The radio transceiver includes a synchronization processor and has several BNC connectors for connection to fixed laboratory equipment

Ultra-low power

A recent breakthrough that combines a new micro-controller and a new class of Micro-SD cards, both available for the first time in 2014, has made it possible to design the system to work with batteries as light as 1 gram.

Wide radio range option

Deuteron's unique radio communication protocol allows the option to control the system at distances up to hundreds of meters.

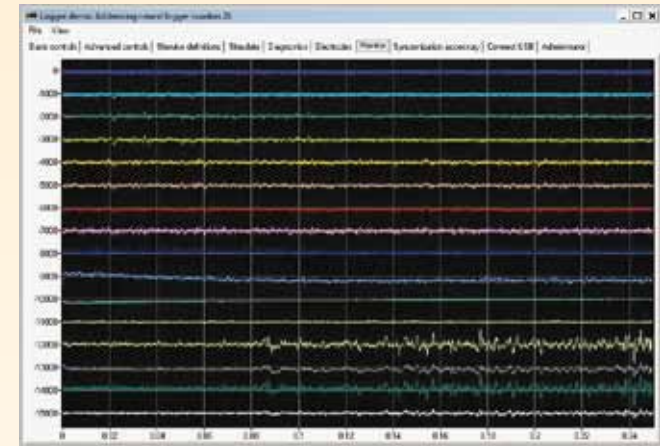
Specifications

Property	Value
Neural inputs	
Signal range	10mV p-p
Resolution	3.3 μ V
Random noise	Approaching Johnson noise fundamental limit. Determined by electrode impedance
Sampling rate	29.3K samples per second
Input capacitance	15pF
Bandwidth	Configurable. Initially switchable 1Hz-7KHz or 300Hz-7KHz
Channels	16
Connector	Omnetics A79043-001 or Molex 54102-0204 (Low profile)
Data storage	
Data capacity	9 hours, 32GB MicroSD card
Security	Secured every 18ms
Synchronization	
External connections	5 BNCs for digital input or output
Signaling LED on logger	1 red omnidirectional LED fully programmable
Radio link	
Radio band	915MHz or 433MHz band
Range	10m monitor, 40m recording 200m recording, optional
Mechanical	
Dimensions	Width: 16.9mm Length: 24mm
Mass of logger	1.6g (Including MicroSD card)
Mass of battery	1.2g (40mAh)
Battery	Lithium polymer single cell
Power consumption	140mW in recording mode
Housing	
The connector on this logger is not designed to support weight, so this logger should not be mounted with its battery on a freely moving animal by its connector alone. Deuteron will work with each user to provide a housing that provides support and protection for this logger compatible with the animal and its electrode assembly. Deuteron can also provide electrode interface boards with built-in supports for this logger.	

Features

Preview monitor

One can view some of the signals in real time on the host computer using the radio link. This can be used to check signal quality before starting a long recording



Reference channel control

The user can select any one of 8 options to be the reference signal that will be subtracted from all other signals before amplification. These are six of the neural input pins, ground, or a dedicated reference input.

Bandwidth

The normal signal bandwidth is switchable between 1Hz-7KHz and 300Hz-7KHz, and the signals are digitized at 29.3Ks/s. Other bandwidth options are available on request.

Customized versions

Many researchers have unique requirements for the experiments they are planning, so customized versions of the software or hardware can be provided where needed.

Battery options

The user can decide on the best size of battery for the application. The required battery mass is about 1 gram for every 40 minutes of recording time.

PC software suite

A suite of software for a Windows computer is provided. Included is a general control panel for setting up and controlling all the logger's features, controlling the synchronizing transceiver, logging external events, and for monitoring signals in real time.