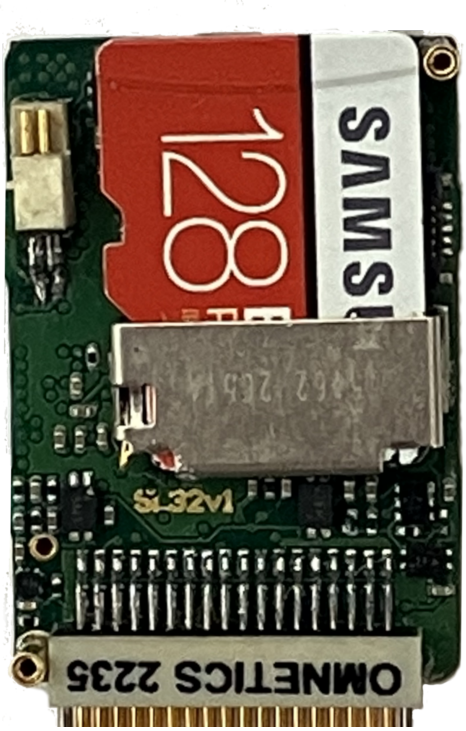
Deuteron Technologies Ltd

Electronics for Neuroscience

SpikeLog32 Specifications



This document provides specifications and instructions that are specific to the SpikeLog32 neural logger. General instructions for use of Deuteron's neural loggers and related software is available on Deuteron's website www.deuterontech.com

General description

SpikeLog32 is a single board neural logger that provides 32 channels of neural recording. It also can record audio and ultrasonic signals using its on-board microphone or from an external transducer. A 9-axis motion sensor can be used to record motion and direction.

Basic capabilities

Function	Properties	Detail
Presentation	Single circuit board, vertical orientation	No standard housing
Neural recording	32 channels	32000 samples per second
Audio / ultrasonic recording	Optional. 1 channel, up to 80kHz bandwidth	50K, 100K or 200k samples per second
Motion sensor	Optional. “9-Axis”; 3D-accelerometer, 3D-gyroscope and 3D-magnetometer	Gyro and accelerometer: 1100 samples per second per axis. Magnetometer: 110 samples per second per axis
Data recording	To removable MicroSD card	Cards up to 512GB are supported
Radio data streaming	Preview only	Limited to about 100Kbytes per second

Specifications

File formats

If configured for neural data only, Deuteron's "Flat" file format can be used. Systems that support motion sensor recording, audio recording, or both use deuteron's "block" file format.

Neural Recording

Function	Properties	Detail
Signal range	10mV p-p	
Digital resolution	0.2µV	
Random noise	2.4µV	For 7kHz bandwidth
Input capacitance	15pF	
Preamplifier bandwidth	Low limit :0.2 to 500Hz High limit: 200Hz to 10kHz	Fully software selectable
Analog filters	Low-pass: 3rd order. High-pass: 1st order	
Sampling rate	32000 samples per second, each channel	Fixed sampling rate
Connector	Omnetics A79025-001	Four corner pins are ground pins
Reference channels	Ground is the default reference, but six of the 32 input pins channel can optionally be selected as a reference channel.	The voltage of the selected reference channel is subtracted from all of the channels before the signals are amplified

Physical and electrical

Function	Properties	Detail
Dimensions	23 x 16 x 3mm	
Mass	2.3g	Including microSD card
Battery voltage	3.7V	Designed for any lithium polymer protected cell above 40mAh
Current consumption	45mAh	Typical when recording, motion sensor off.
Memory card capacities	8GB – 512GB	

Motion Sensor

Note: Motion sensor functions are available only in software versions that support block file format.

Function	Properties	Detail
Accelerometers		
Number of axes	3	
Data rate for each axis	1000 ± 10	Samples per second
Measurement ranges	±2g, ±4g, ±8g, ±16g	4 software-selectable ranges
Resolution	61µg, 123µg, 246µg, 492µg	16-bit, according to range
Noise PSD	300µg / sqrt Hz	
Gyroscopes		
Number of axes	3	
Data rate for each axis	1000 ± 10	Samples per second
Measurement ranges	250°/s, 500°/s,1000°/s, 2000°/s	4 software-selectable ranges
Resolution	0.076°/s, 0.015°/s, 0.031°/s, 0.061°/s	16-bit, according to range
Noise PSD	0.01 (°/s) / sqrt Hz	
Magnetometers		
Number of axes	3	
Data rate for each axis	111 ± 3	Samples per second
Measurement range	±4.8	mT
Resolution	0.6µT	14 bit
Uncorrected zero error	300	µT

Audio Recording

Function	Properties	Detail
On-board sensor	Knowles SPU0410LR5H-QB	Sensitive beyond 80kHz
Audio bandwidth. Upper limit	80kHz	
Audio bandwidth, Lower limit	300Hz	
Audio sampling rates	50kHz, 100kHz, 200kHz	
Audio sensitivity	High sensitivity: 60µPa/bit (5dBA per bit level)	16 bit range is 80dBA

Spectral response of microphone in audio and ultrasonc ranges as characterized by Knowles.