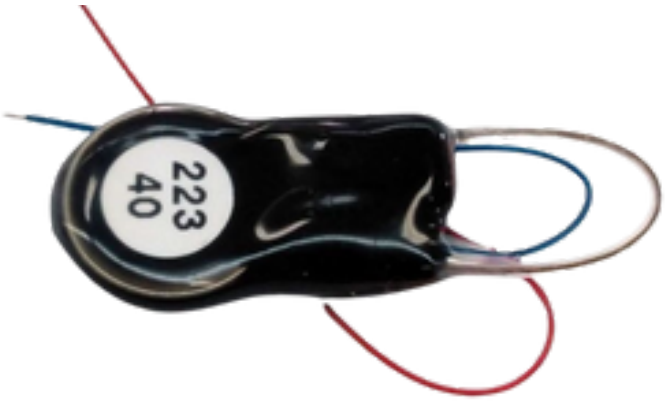
OPEN SOURCE INSTRUMENTS INC.

WIRELESS TELEMETRY

24-7 RECORDING FROM COHABITING ANIMALS

System Capabilities

- **Wireless** sensors and stimulators.
- **Implantable** and **head-mounting**.
- **Continuous recording** of biopotentials.
- Cohabiting, **freely-moving** animals.
- **High fidelity** recordings.
- **Free software**, export to other formats.
- Automatic **event detection.**
- **Synchronous video** for behavioral studies.



Subcutaneous Transmitter (SCT)

Our SCTs are fully implantable in both rats and mice.

- Offers 1-4 channels
- Low-frequency cut-off: **0 Hz (DC) to 20 Hz (AC)**
- High-frequency cut-off: **20 - 640 Hz**
- Dynamic range: **30 - 600 mV**
- Device mass: **1.6 - 14.0 g**
- Sample rate: **64 - 2048 SPS**
- Low frequencies: **DC and AC**
- Operating life: **5 - 500 days**, config-dependent

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SCT Configuration

Version	A3048S2 (1 channel)	A3049Q3 (2 channels)
Inputs	0.2-80 Hz, 256 SPS, 30 mV	0.24-160 Hz, 512 SPS, 30 mV / 0.16-160 Hz, 512 SPS, 30 mV
Price (US)/Unit	$600	$600
Volume (ml)	0.9	4.0
Mass (g)	1.9	8.7
Operating life (dy)	41	184

Table: *Two example configurations, one for mice, and one for rats. Our system allows customers to order transmitters with configurations specific to their needs.*

SCT Operating Life

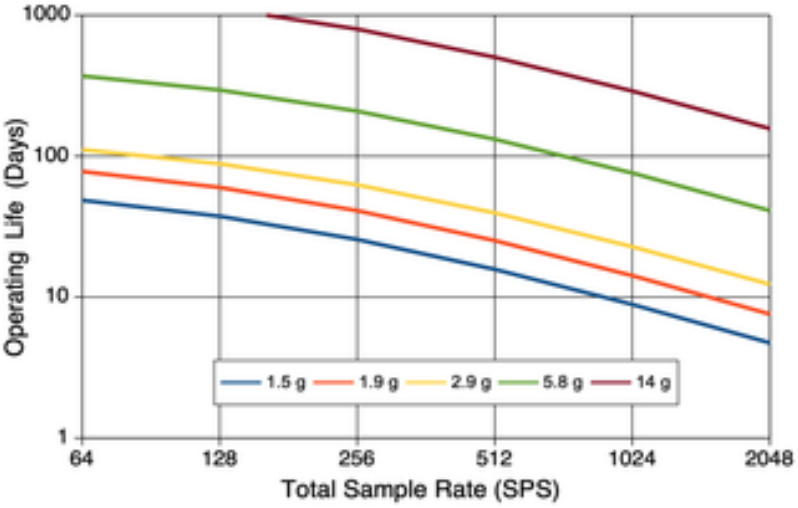

Figure: *Battery life vs. sample rate for various sizes of SCT.*

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Depth Electrodes

We offer various depths electrodes, which are compatible with all of our transmitters. Visit our website for a full catalog of all lead termination options.

Name	Price/Unit	Description
X-Electrode	$30	Locate with hypodermic tube, crimp wire into Q-Ferrule.
W-Electrode	$50	Locate with hypodermic tube, E-Socket mates with D-Pin termination.
J-Electrode	$60	Locate with guide cannula, E-Socket mates with D-Pin termination. Guide cannula removed during surgery.
R-Electrode	$85	Locate with guide cannula, E-Socket mates with D-Pin termination. Guide cannula remains in place after surgery.

Table: *Catalog of Depth Electrodes. Depth electrode wire is 125-µm diameter 316SS with teflon insulation of 200-µm diameter.*

Figure: *From left to right X, W, J, and R electrodes.*

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Data Acquisition System

Example 1, Telemetry Control Box: 1 TCB-A16 and 16 antennas enable telemetry recording from 2 IVC racks or 4 bench-top Faraday enclosures. (*Approx. $24K USD).*

Example 2, Animal Location Trackers: 4 ALTs enable telemetry recording and animal activity measurement from all animals in 4 cages in 1 bench-top Faraday enclosure. *(Approx. $27K USD).*

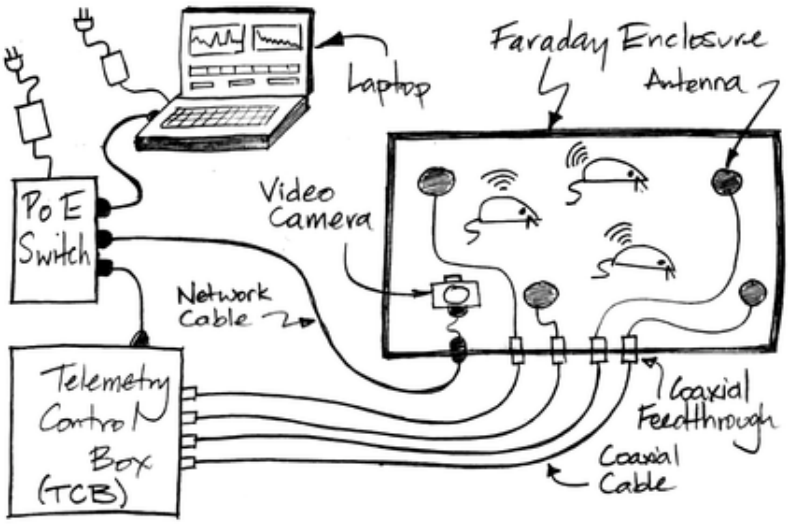

Figure: *Schematic of Data Acquisition System.*

Data Quality

Our instruments' performance is fully characterized.

- Total noise < 8 µV rms (at 0.3 - 160 Hz).
- Mains hum noise less than 1 µV (50Hz/60 Hz)
- No device-generated movement artifacts.
- Guaranteed reception from active animals.
- Wide dynamic range, 16-bit precision.
- Specified gain versus frequency.

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System-Compatible Devices

- **Implantable Stimulator Transponder:** Provides pulsed, variable-current, electrical stimulation or optogenetic stimulation.

- **Head Mounting Transmitter:** For very long-term recordings, replaceable battery.

- **Implantable Inertial Sensor:** An implantable 3-axis accelerometer with 3-axis gyroscope.

- **Animal Cage Camera:** Telemetry-compatible camera that provides synchronous video recordings to ±0.1 s with variable-intensity white and infrared lighting.

- **Blood pressure monitor:** An implantable blood pressure sensor. Sensor connects to catheter and measures blood pressure with precision 0.4 mmHg (50 Pa) at 128 SPS. *(In development).*

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About Us

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Open Source Instruments Inc. (OSI) designs and manufactures instruments for scientific research. We provide free software to control and read out the instruments we sell. Our software runs on Linux, MacOS, and Windows. While most of our customers work in neuroscience and medical research, we also work with researchers in astronomy and physics. OSI was founded in 2005 in order to manufacture precision survey instruments for high energy physics particle detectors at CERN. The founder remains the company's lead engineer. The majority of our products have been designed and developed at the request of researchers.

Featured Publications

Peripherally-derived LGI1-reactive monoclonal antibodies cause epileptic seizures in vivo (Apr 2024) Upadhya et al, *Brain*, doi: 10.1093/brain/awae129.

Cognitive impairments in a Down syndrome model with abnormal hippocampal and prefrontal dynamics and cytoarchitecture (Jan 2023) Muza et al, *iScience*, doi: 10.1016/j.isci.2023.106073

Specific inhibition of NADPH oxidase 2 modifies chronic epilepsy (Dec 2022) Singh et al, *Redox Biol*, doi: 10.1016/j.redox.2022.102549.

Medial septal GABAergic neurons reduce seizure duration upon optogenetic closed-loop stimulation (Mar 2021) Gonzalez-Sulzer et al, *Brain*, doi.10.1093/brain/awab051.