Flex Array v3

Flex Array

Features

- **10mm shank length.**
- 16 carbon fiber electrodes arranged in two rows of 8.
  - 132µm pitch between fibers within the same row.
  - 50µm between rows of fibers.
  - Fiber length can be cut between 150 – 500µm.
- Electrode tips can be prepared in a variety of ways.
  - Through electrodeposition of conductive materials at the tip for spatially targeted electrophysiology recordings.
  - By exposing 100µm or more of bare carbon for large dopaminergic responses.
  - Or by exposing ~50µm of carbon fiber to record from both modalities but with less electrical spatial sensitivity and lower dopaminergic response.
- Separate reference connections for electrical and chemical sensing.
- 36-pin Omnetics connector for interfacing.
- Reference and ground wires are 50mm long Teflon coated silver wire (AWG 36) with 20mm exposed at the end.

Description

The flex array utilizes subcellular carbon fibers for electrophysiological and/or dopaminergic recordings. The polyimide substrate minimizes the overall size of the device. The use of a glass guide cannula allows for flexibility in reaching a variety of target depths in the brain up to 7mm deep. Additionally, groups have used the devices, without the glass cannula, to record activity from rodent and aplysia ganglia. The channels are accessed through an Omnetics 36-pin connector and works with most recording systems on the market.
FSCV-16CH Headstage

Features

- 16 independent op-amp channels.
- Capable of applying a triangular ramp from -0.4V to 1.3V at 400V/s.
- Connects to interface box via DB25.
- Can also incorporate a stimulation signal via two auxiliary wires.

Description

The fast scan cyclic voltammetry headstage can drive 16 carbon fiber electrodes. Individual switches on the headstage allow for terminating broken or bad channels to avoid signal contamination. The headstage connects to National Instruments Connector Blocks (CB-68L) via a DB25 connection. The blocks then connect to NI DAQ Cards (PCIe-7841) via shielded cable. All signal generation and data acquisition is controlled through custom LabVIEW VIs.

Recording System Compatibility

Pre-amplifiers are required to ensure low-noise and are widely available. Any 36-pin Omnetics male headstage is compatible with the flex array. All testing to date has used an Intan RHD2132 amplifier board (www.intantech.com). Also any other amplifier board with this connector would work including products from Ripple, TDT, Plexon, Neuralynx, Triangle Biosystems, etc.

Applications

- Acute recordings of dopaminergic or electrophysiological activity in anesthetized animals.
- Chronic recordings of dopaminergic or electrophysiological activity in awake animals.
- LabVIEW VIs and interface cards be modified to acquire behavioral data.
Typical System Configuration – Electrophysiology

Flex Array
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Pre-Amp
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Amplifier or Interface Board
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PC

1-2 meters

Typical System Configuration - FSCV

Flex Array
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FSCV-16CH Headstage
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Breakout Box
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PC

1-2 meters

Description

The flex array can be used to sense either electrical or chemical activity by switching headstages. The same PC can be used for both modalities. Internally we use an Intan RHD2132 pre-amp headstage and RHD2000 interface board. We recognize many labs use other commercial systems and software. Please contact to discuss your application. Control of the FSCV-16CH headstage is done through LabVIEW via NI shielded cables and DAQ Cards. All required software will be made available on our website mint.engin.umich.edu.

References