Wireless Recording System

The all-in-one solution for wireless recording, and analyzing in vivo.

- 4, 8, 16 or 32 channels
- 16 bit resolution
- Lightweight headstage
- Wide effective recording range (5 m)
- Excellent signal-to-noise ratio
- Flexible battery options
Wireless recording system

The wireless in vivo system is the all-in-one solution for amplifying, recording, and analyzing in vivo data from 4, 8, 16 or 32 channels. The amplifier bandwidth is 1 Hz to 5 kHz, sampled at 20 kHz per channel (up to 8 channels simultaneously). With a resolution of 16 bit, the accuracy of your data is guaranteed.

The system includes everything you need: Small-sized headstage with integrated A/D converter, digitized transmission, powerful receiver, as well as the well-known and widely-used software package MC_Rack.

With its excellent signal-to-noise ratio, it is the ideal solution for spikes, LFP, EEC, ECG, and ECoG. Additional inputs to the receiver allow the synchronization of the data with external devices.

Digital data transmission

The Wireless-System converts the recorded signals into digital data already on the headstage. Therefore, the signal-to-noise ratio is much better and most importantly, independent from the distance between sender and receiver.

The signal amplitude is independent of the distance, too, and your data arrives safely and completely at the receiver for further analysis. Thereby, the digital data transmission permits flexible long-term experiments in large environments.

Recording in freely moving animals

Innovative wireless recording systems with extremely small and lightweight headstages allow the recording of neuronal activity in freely moving animals.

A/D conversion at 20 kHz sampling rate per channel (8 channels simultaneously) in the headstage dramatically increases the quality of the recorded signals. The Wireless-System is the first choice when recording single unit spikes.
Energy-efficiency and flexibility

All devices of the Wireless-System are designed to be energy-efficient. They are all powered via USB, there is no need for extra power supply. The standard battery of the headstage permits continuous recording of all channels for more than 2 hours. Recharging is then realized via USB, too.

When doing experiments with animals insensitive to weight, we also offer larger batteries, which provide longer recordings. Please contact Multi Channel System for more information on battery options.

For power-saving, the headstage switches to stand-by mode when the data acquisition is stopped. As soon as you click the start button again, it switches on automatically. Another possibility is to switch off the headstage completely via the software MC_Rack. When switching on, you can use an infrared flashlight in order to not disturb the animal. Please see the graph below for switching possibilities.

Another possibility for energy-saving is provided by the software MC_Rack. It gives you the opportunity to switch off single channels, simply by deselecting them with one single mouse click. Apart from energy-saving, this feature also offers you the possibility for an even higher sampling rate. When recording from two channels of the 4-channel headstage or four channels of the 8-channel headstage, you can sample the data at up to 40 kHz per channel.

Parallel experiments

The Wireless-System offers the possibility to run up to four independent set ups in one room. You can open the software MC_Rack four times and run four independent experiments.

Moreover, one Wireless-System facilitates the sequential recording from up to four headstages. Run your experiments with four animals at the same time and switch easily between the headstages for recording. You can select the headstage you want to record from quickly with one mouse click using the software MC_Rack.

Concluding, you can record data from up to 16 headstages in one room.
**Wireless System: Technical specifications**

Number of channels: 4, 8, 16 or 32

Dimensions (W x D x H):
- Headstage:
  - 4 channels: 13 mm (+antenna) x 13 mm x 5 mm (+ battery)
  - 8 channels: 16 mm (+antenna) x 16 mm x 5 mm (+ battery)
  - 16 channels: 16 mm (+antenna) x 16 mm x 6.5 mm (+ battery)
  - 32 channels: 16 mm (+antenna) x 16 mm x 7.5 mm (+ battery)
- Receiver: 110 mm x 78 mm x 29 mm
- USB interface: 110 mm x 78 mm x 29 mm

Weight (Headstage):
- 4 channels: 2.2 g (+ battery)
- 8 channels: 2.9 g (+ battery)
- 16 channels: 3.6 g (+ battery)
- 32 channels: 3.7 g (+ battery)

Battery: Lithium-Polymer, rechargeable

Battery life (until recharge):
- 4 channels: 3.2 hours (recording @ 20 kHz)*
- 8 channels: 2 hours (recording @ 20 kHz)*
- 16 channels: 1.7 hours (recording @ 10 kHz)*
- 32 channels: 1.3 hours (recording @ 5 kHz)*

* with 100 mAh battery

Resolution: 16 bit

Input voltage range: ± 12.4 mV

Sampling rate (kHz per channel):

<table>
<thead>
<tr>
<th>Type of head-stage</th>
<th>sampling rate (kHz/ch)</th>
<th>Number of selected channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>W4-HS</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>W8-HS</td>
<td>40</td>
<td>4</td>
</tr>
<tr>
<td>W16-HS</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>W32-HS</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>

Bandwidth: 1 Hz to 5 kHz (0.1 Hz on request)

Distance for wireless link: 5 m guaranteed

Max. cable length between receiver and USB interface: 100 m

Control interface: USB 2.0

Software:

- Operating system: Windows XP, Vista, 7 or 8 with NTFS
- English and German versions supported
- MC_Rack program: Version 4.1.0 and higher
- MC_DataTool program: Version 2.6.2 and higher
- Data export: ASCII (*.txt), binary file (*.raw) format

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