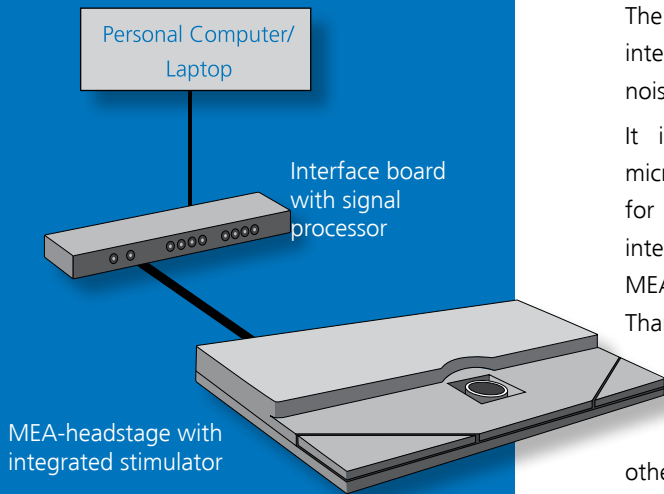




Versatile *in vitro* recording system: MEA2100-System

- Integrated stimulation
- Filter bandwidth adjustable via software
- Up to 240 recording channels
- Variable contact units for microelectrode arrays with 32, 60, or 120 electrodes
- Multi-well and multiple headstage solutions possible for higher throughput



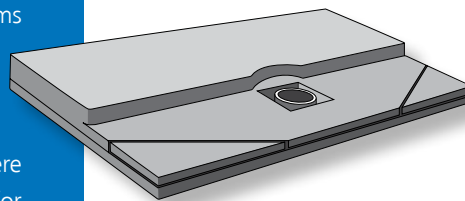
Versatile *in vitro* recording system: MEA2100-System

The MEA2100-System is a versatile *in vitro* recording system with integrated stimulation, following the tradition of high-quality, low-noise amplifiers.

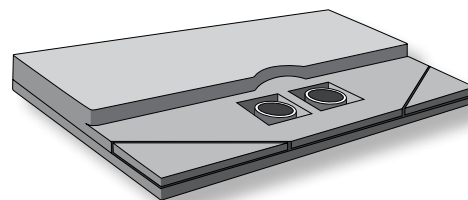
It is the complete setup for extracellular recordings from microelectrode arrays (MEAs), including everything you need for your experiment: data acquisition computer with software; interface board; MEA-headstage with integrated stimulation; MEAs; as well as temperature controller and perfusion heating. Thanks to its compact design, you can position the MEA-headstage on any inverted or upright microscope. It is connected via a single SATA cable to the interface board, which offers various analog inputs and digital in-/outputs for synchronization with other instruments.

Variable contact unit

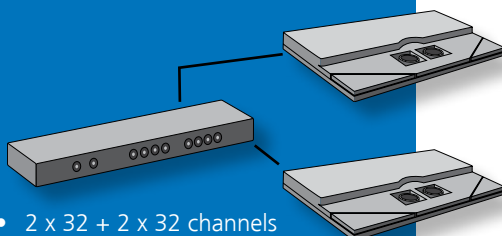
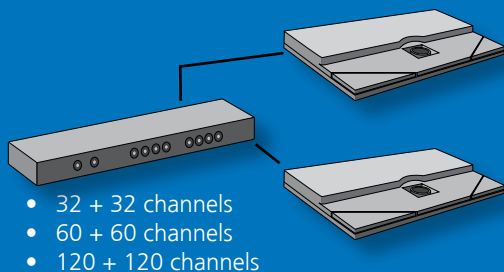
The main advantage of the MEA2100-System is its flexibility. Multi Channel Systems offers various contact units for the MEA-headstage. Variants for one 60-electrode MEA, one 120-electrode MEA, or even two 60-electrode MEAs are available. There are also versions for 32-electrode MEAs for acute slice recordings (see next page). The contact unit of the MEA-headstage can be changed according to your experimental needs. The rest of the setup is not affected, so changing the contact unit is simple, quick, and cost-effective.



- 32 channels
- 60 channels
- 120 channels



- 2 x 32 channels
- 2 x 60 channels

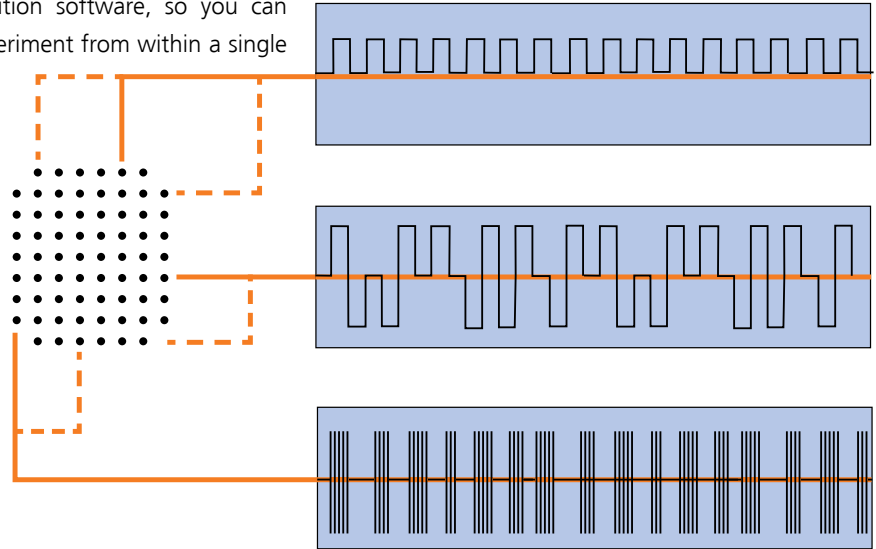


Multiple headstages

The flexibility of the MEA2100-System is also reflected in the possibility to connect two MEA-headstages to one interface board. This way, you can record from up to 240 channels. By using two headstages with two 60-electrode MEAs each, you have a four-fold system and increased throughput. The headstages are controlled independently by opening multiple instances of the data acquisition software.

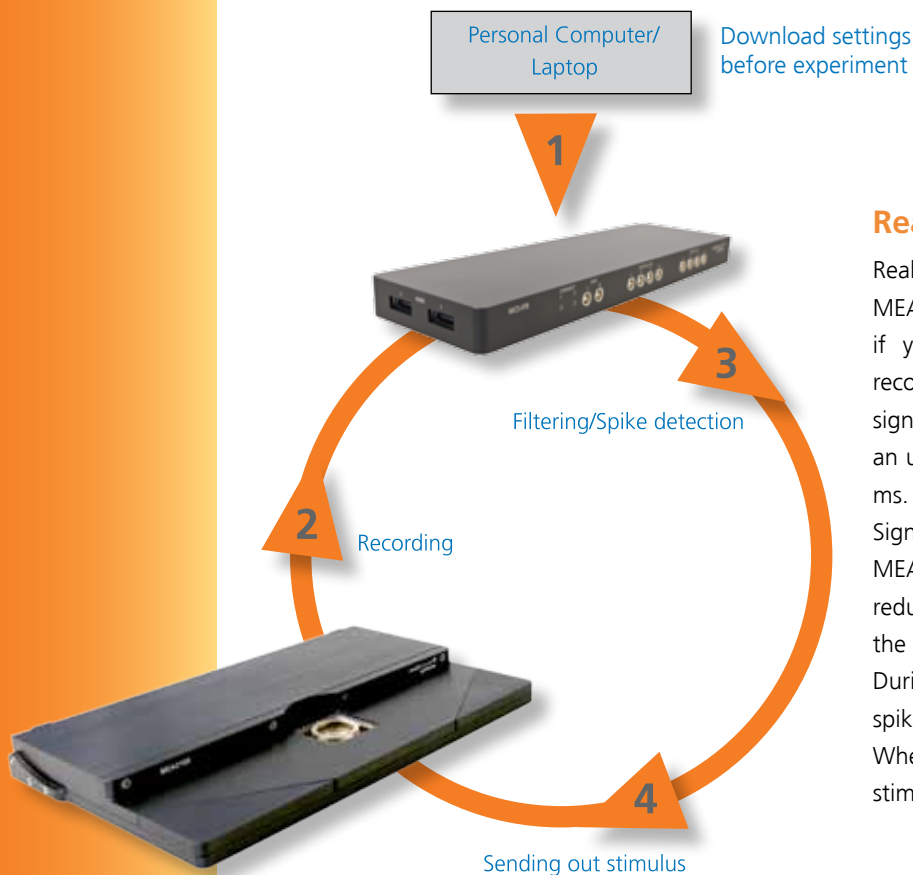
Stimulation integrated in MEA-headstage

The integrated stimulus generator offers 3 different stimulation patterns (monophasic, biphasic, bursts) per available MEA. You can choose between current and voltage stimulation and select each electrode for stimulation. All configurations (stimulation patterns, output, and electrodes) are defined via the included Multi Channel Suite data acquisition software, so you can control all parameters of your experiment from within a single program.



Flexible and powerful: Multi Channel Suite

The Multi Channel Suite data acquisition and analysis program is highly adaptable with essentially limitless possibilities. Multi Channel Suite is a brand new software based on more than 20 years of experience.



Real-time signal detection and feedback

Real-time signal detection/feedback is integrated in all MEA2100-60 and -120-Systems. It is an essential feature if you need fast and predictable reactions related to recorded analog signals without time delay. Normally, the signal must be analyzed by the computer, which leads to an unpredictable time delay of the stimulus of at least 100 ms. By moving the analysis from the PC to the DSP (Digital Signal Processor) integrated in the interface board of the MEA2100-System, the detour is obsolete and the time delay reduced well below 1 ms. Simply define the condition for the feedback and download it to the interface board (1). During recording (2), the DSP filters the data and detects spikes (3), checking whether your condition is fulfilled. When a designated event is detected, the integrated stimulus generator generates the stimulus pulse (4).

32-electrode perforated MEAs

This image shows an acute hippocampal slice on a 32 channel pMEA. Through the perforation, suction is applied to the slice from below. The suction keeps the slice in place and ensures a good electrode-to-tissue contact without the need for additional weight.

The four different layouts of the 32 channel pMEAs have been developed for experiments with hippocampal slices, but can be used for any acute slice preparation.

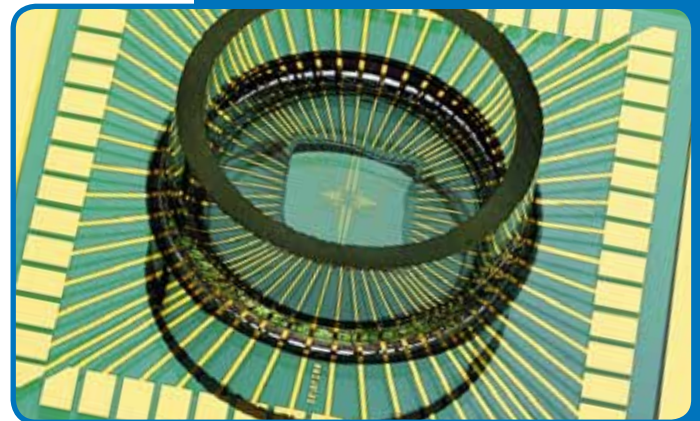
The MEAs contain 32 recording and 12 stimulation electrodes. Recording is done from all 32 channels. Any of the 12 stimulation electrodes can be connected via software control to any of the three channels of the internal stimulus generator.



60-electrode MEAs: The widest range

MEAs with 60 electrodes are available in many variations. They are offered as standard glass as well as perforated MEAs, with different electrode materials (titanium nitride, gold) and in various layouts. You can choose between different electrode diameters and spacings, 8x8 or 6x10 grid, or select a high density layout. These MEAs are also available as "ThinMEAs", which are as thin as a coverslip (180 μm). This makes them ideal whenever high resolution imaging is combined with MEA technology.

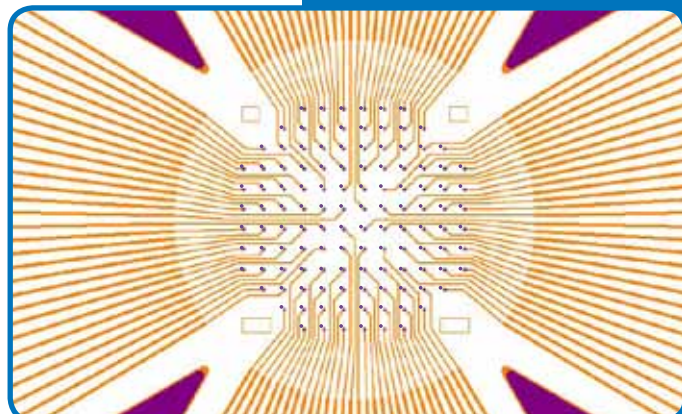
In this range, you will definitely find the right MEA for your application. If you need any help in selecting the most appropriate type, please contact our support team.



MEAs with 120 electrodes

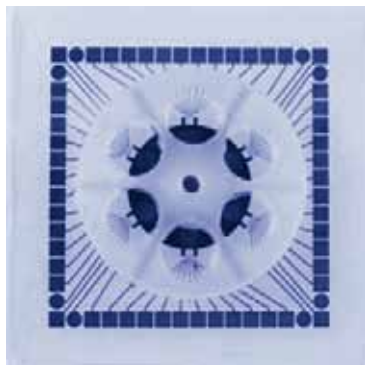
The MEA2100-System is the only MEA-System that can be operated with MEAs with 120 electrodes. They are arranged in a 12x12 grid, sparing 6 electrodes in each corner. Any electrode is selectable for stimulation via the included software. Just click on the respective electrode and it will be used for stimulation.

Currently, 120MEAs are available with 30 μm , 100 μm , 200 μm or 1000/1500 μm electrode spacing and 10 μm or 30 μm electrode diameter. There are both standard glass and perforated MEAs. Other configurations are under development. Please contact us if you need a custom layout.



Higher throughput with flexible multi-well solutions

The MEA2100-System offers the possibility to connect two headstages to one interface board. This way, you can record from up to 240 channels. For example, you can connect two headstages for two 60-electrode MEAs each. If four 6-well MEAs are used in two headstages, it is possible to record from 24 wells in parallel. However, you are not limited to multi-well solutions. By using different MEAs, the setup can be optimized for a completely different application within seconds.



6-well MEA

In the 6-well microelectrode array, the 60 recording electrodes are divided into 6 independent wells with 9 recording electrodes each. Independent measurements can be performed in each well.

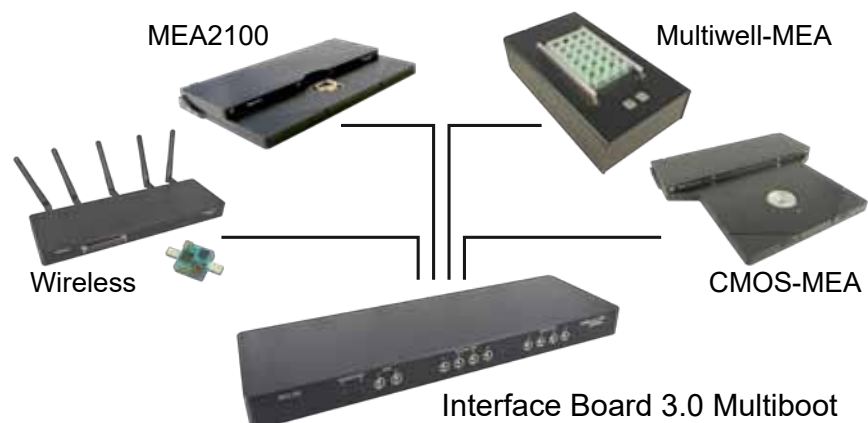
These arrays are ideal for toxicology, stem cell research, and safety pharmacology, as they considerably increase the throughput of your system. A maximum of 24 wells on four MEAs can be recorded in parallel with one MEA2100-System.

Interface board 3.0 multiboot

The MCS-IFB 3.0 multiboot is a new generation of interface boards, which is able to receive data from multiple MCS *in vivo* and *in vitro* recording systems, which makes cost-effective combinations with only one interface board and multiple recording systems possible.

As a result, you have even more flexibility in switching between possible configurations for your specific research needs. You can establish your experiments for example on 60 or 120 electrodes with the MEA2100-System, then purchase the Multiwell-headstage and start high throughput screening.

It is also possible to use the same interface board for *in vitro* MEA experiments and wireless *in vivo* recordings. This new interface board provides flexibility at its best.



MEA2100-System: Technical Specifications

General characteristics

Dimensions (W x D x H)	Headstage: 250 mm x 151 mm x 25 mm Interface board: 250 mm x 83 mm x 25mm
Weight	Headstage: 1.0 kg Interface board: 0.3 kg

Amplifier

Data resolution	24 bit
Number of recording channels	32-120 (depending on headstage type)
Bandwidth	0.1 Hz to 10 kHz

Stimulus generator

Number of stimulation channels	3 independent patterns per MEA slot
Available waveforms	rectangular, sine wave, arbitrary
Output current	± 1.5 mA
Output voltage	± 12 V

Data converter and USB interface

Control interface	USB 3.0
Sampling rate per channel	up to 50 kHz per channel

Heating element and temperature sensor

Temperature accuracy	± 0.1 °C
Temperature sensor type	PT 100 with 4 wire connection

Software

Operating system	Windows 10, 8.1 or 7 (64 bit) English and German versions are supported
Multi Channel Experimenter	Version 2.1.4.16188 and higher
Multi Channel Analyzer	Version 2.1.4.16188 and higher
Multi Channel DataManager	Version 1.8.5.0 and higher
Data export	HDF5 (*.h5) (Matlab, Python, R, etc.), NeuroExplorer (*.nex), Spike2 (*.smr), ASCII file (*.txt), European Data Format (*.EDF+)

Check out our website on MEA-technology:
www.multielectrodes.com



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