

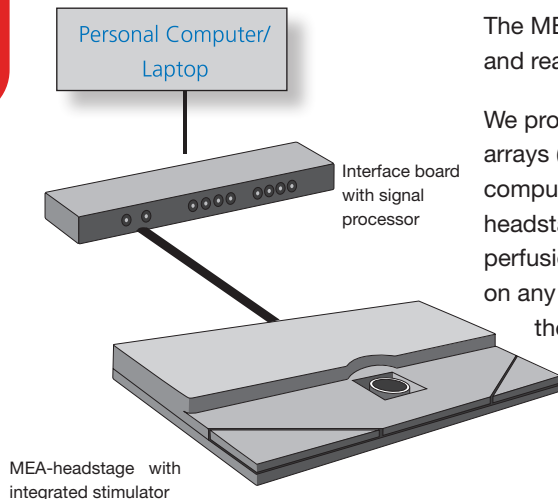
MEA2100-System

Versatile in vitro recording system



- Integrated stimulation and blanking
- Filter bandwidth adjustable via software
- 24 bit resolution
- Real-time feedback
- Up to 256 recording channels
- Variable contact units for microelectrode arrays with 60, 120 or 256 electrodes
- 可通过软件调节滤波器带宽
- 24位分辨率
- 实时反馈
- 多达256个记录通道
- 用于60、120或256个电极的微电极阵列的可变接触单元





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

We provide the complete setup for your extracellular recordings from microelectrode arrays (MEAs), including everything you need for your experiment: data acquisition computer with powerful software; interface board with multiboot functionality; 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 eSATA cable to the interface board, which offers various analog inputs and digital in-/outputs for synchronization with other instruments.

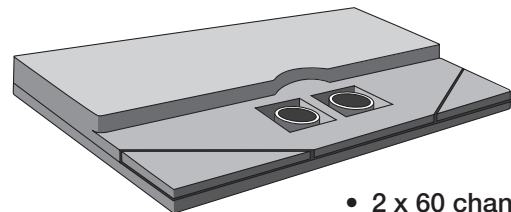
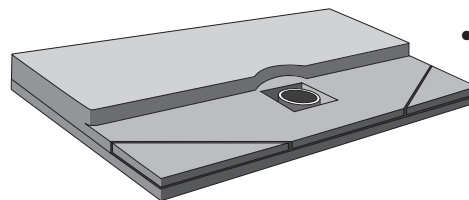
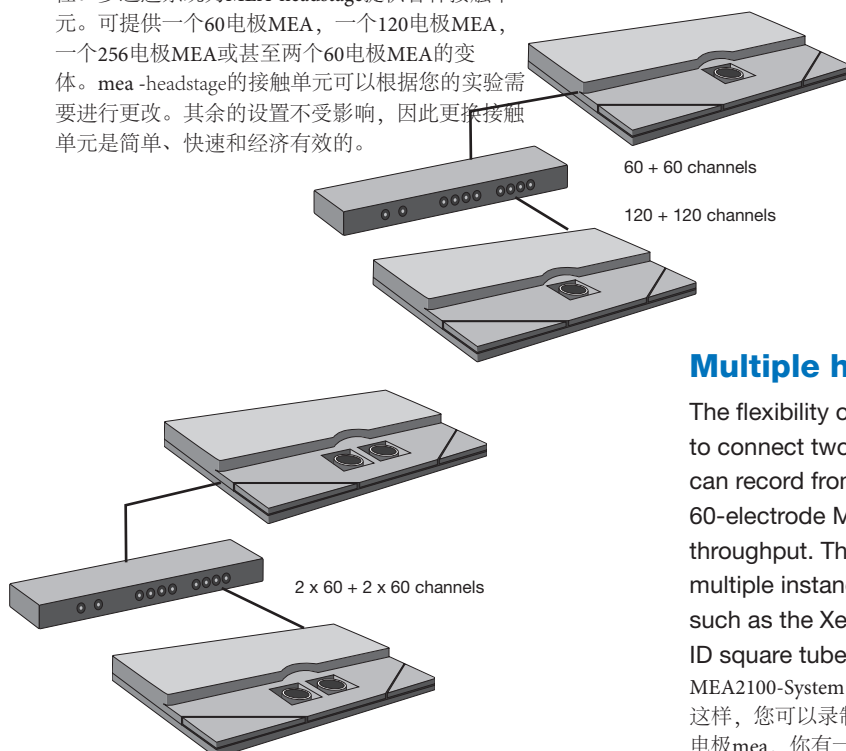
MEA2100-System是一款多功能体外记录系统，具有集成的刺激和实时反馈，遵循高质量，低噪声放大器的传统。我们为您的微电极阵列(MEAs)的细胞外记录提供完整的设置，包括您实验所需的一切：具有强大软件的数据采集计算机；具有多引导功能的接口板；综合增产的MEA-headstage；以及温控器和灌注加热。由于其紧凑的设计，您可以在任何倒置或直立显微镜上定位mea-headstages。它通过一根eSATA电缆连接到接口板，提供各种模拟输入和数字输入/输出，与其他仪器同步。

- 60 channels
- 120 channels
- 256 channels

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, one 256-electrode MEA or even two 60-electrode MEAs are available. 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.

可变接触单元mea2100系统的主要优点是其灵活性。多通道系统为MEA-headstage提供各种接触单元。可提供一个60电极MEA，一个120电极MEA，一个256电极MEA或甚至两个60电极MEA的变体。mea-headstage的接触单元可以根据您的实验需要进行更改。其余的设置不受影响，因此更换接触单元是简单、快速和经济有效的。



- 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. Larger cell structures such as the *Xenopus* oocyte. Solutions are delivered through 1.0 mm ID square tubes (SG1000-5) with barrel-to-barrel spacing of 1.4 mm. MEA2100-System的灵活性还体现在可以将两个mea-headstages连接到一个接口板上。这样，您可以录制多达240个通道。通过使用两个headstages，每个headstage有两个60电极mea，你有一个四倍的系统和增加的吞吐量。通过打开数据采集软件的多个实例来独立控制主控台。更大的细胞结构，如爪蟾卵母细胞。解决方案通过1.0 mm内径的方管(SG1000-5)输送，筒身间距为1.4 mm。

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.

MEA2100-System提供了将两个headstages连接到一个接口板的可能性。这样，您可以录制多达240个通道。例如，您可以连接两个60个电极的headstages。如果在两个headstages中使用4口6井mea，则可以同时记录24口井的数据。然而，您并不局限于多井解决方案。通过使用不同的mea，可以在几秒钟内针对完全不同的应用程序优化设置。

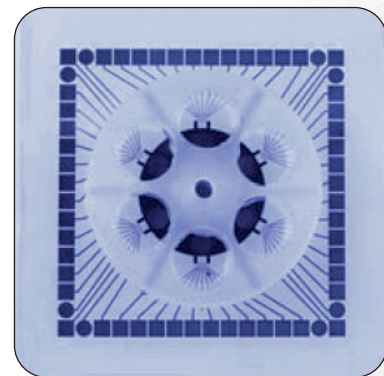


6-well MEA

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. 在6孔微电极阵列中，60个记录电极被分为6个独立的孔，每个孔有9个记录电极。可以在每口井中进行独立测量。这些阵列是毒理学、干细胞研究和安全药理学的理想选择，因为它们大大增加了系统的吞吐量。一个mea2100系统最多可以同时记录4个mea上的24口井。



Interface board 3.0 multiboot

The MCS-IFB 3.0 multiboot is a new generation of interface boards, which enables you to operate a wide range of MCS in vitro and in vivo headstages: MEA2100-HS, MEA2100-Mini-HS, MEA2100-Beta-Screen, Multiwell-MEA-HS, CMOS-MEA-HS, W2100-RE, and ME2100-HS. This allows cost-effective combinations with only one interface board and multiple recording systems.



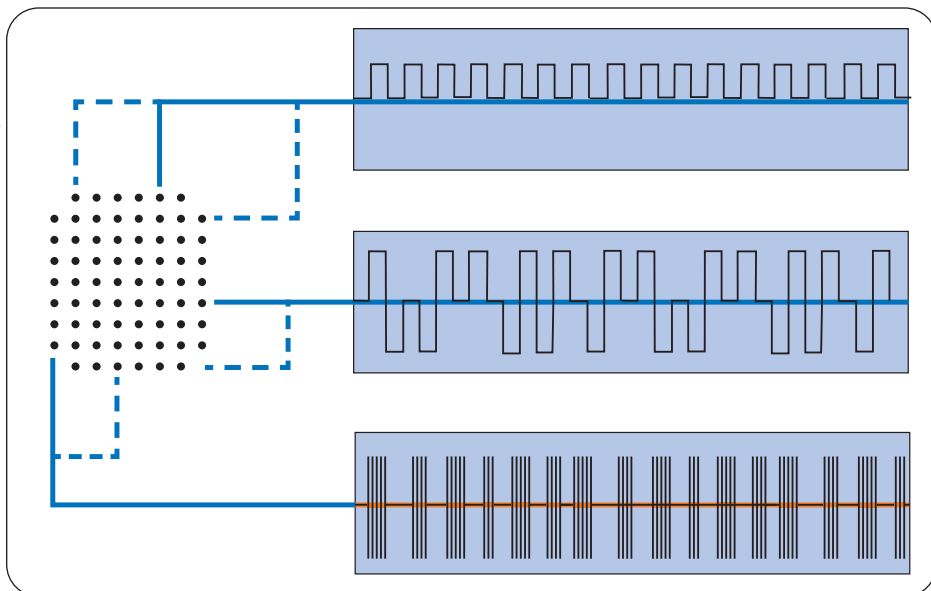
As a result, you have even more flexibility in switching between possible configurations for your specific research needs. You can establish your experiments for example on 60, 120 or 256 electrodes with the MEA2100-System, then purchase the Multiwell-headstage and start high throughput screening.

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.

Stimulation integrated in MEA-headstage

The integrated stimulus generator offers up to 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.

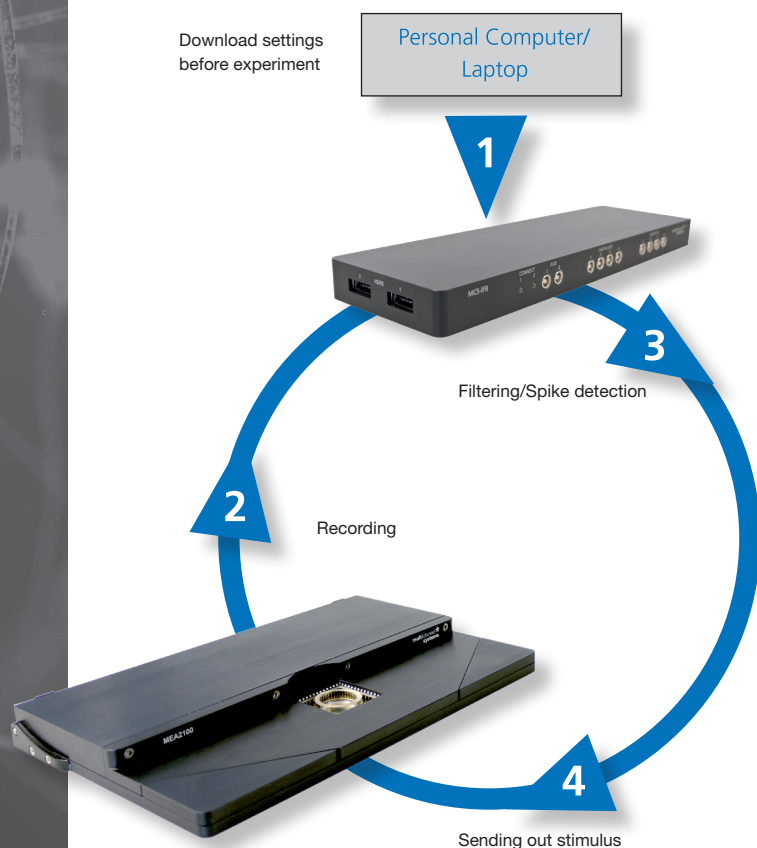
集成的刺激发生器提供多达3种不同的刺激模式(单相, 双相, 爆发)每个可用的MEA。您可以选择电流和电压刺激, 并选择每个电极的刺激。所有配置(刺激模式, 输出和电极)都通过所包含的Multi Channel Suite数据采集软件定义, 因此您可以在单个程序中控制实验的所有参数。



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.

综合刺激发生器提供多达3种不同的刺激模式(单相, 双相, 爆发)每个可用的MEA。您可以选择电流和电压刺激, 并选择每个电极的刺激。所有配置(刺激模式, 输出和电极)都通过所包含的Multi Channel Suite数据采集软件定义, 因此您可以在单个程序中控制实验的所有参数。灵活和强大:多通道套件的多通道套件数据采集和分析程序是高度适应性与本质上无限的可能性。多通道套件是一个全新的软件基于超过20年的经验。



Real-time signal detection and feedback

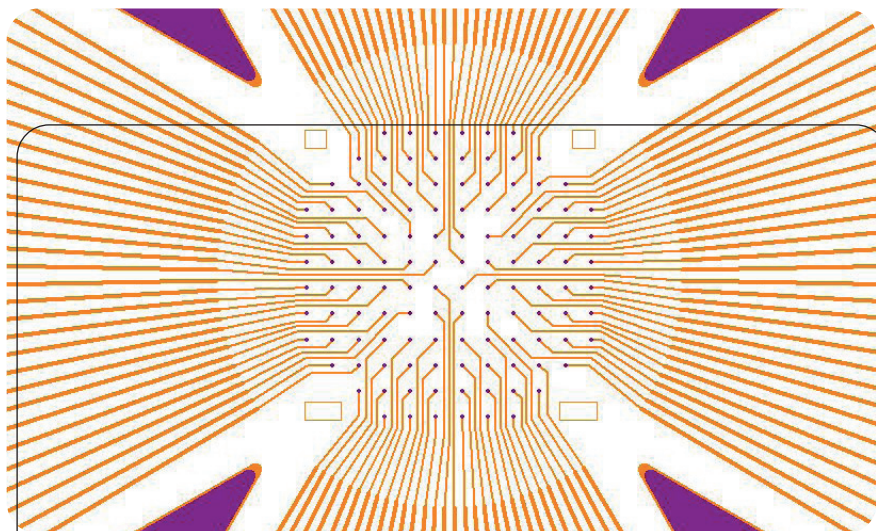
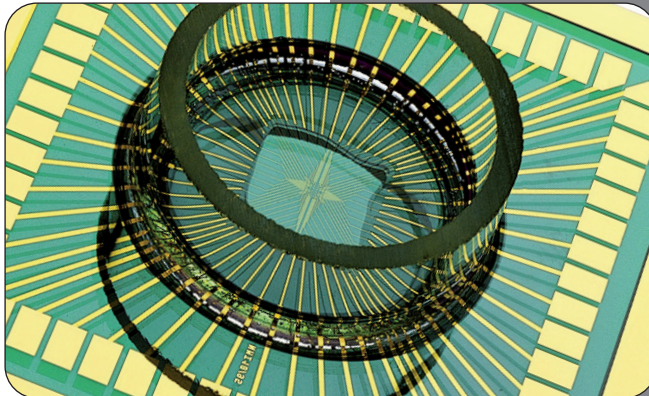
Real-time signal detection/feedback is integrated in all MEA2100-60 and -120-Systems. It is an essential feature if you need fast and predictable reactions related to recorded analog signals without time delay. Normally, the signal must be analyzed by the computer, which leads to an unpredictable time 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).

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.

具有60个电极的mea有许多变体。它们提供标准玻璃和穿孔mea，具有不同的电极材料(氮化钛，金)和各种布局。您可以选择不同的电极直径和间距，8x8或6x10网格，或选择高密度布局。这些mea也可称为“thinmea”，薄如盖盖(180 μm)。这使得它们在高分辨率成像与MEA技术相结合时非常理想。



MEA2100-System是唯一一款可以使用120个电极的mea操作的MEA-System。它们排列成12x12的网格，每个角保留6个电极。任何电极是可选择的刺激通过所包含的软件。只需点击相应的电极，它将用于刺激。目前，120mea的电极间距为30 μm 、100 μm 、200 μm 或1000/1500 μm ，电极直径为10 μm 或30 μm 。有标准玻璃和穿孔mea。其他配置正在开发中。如果您需要自定义布局，请与我们联系。

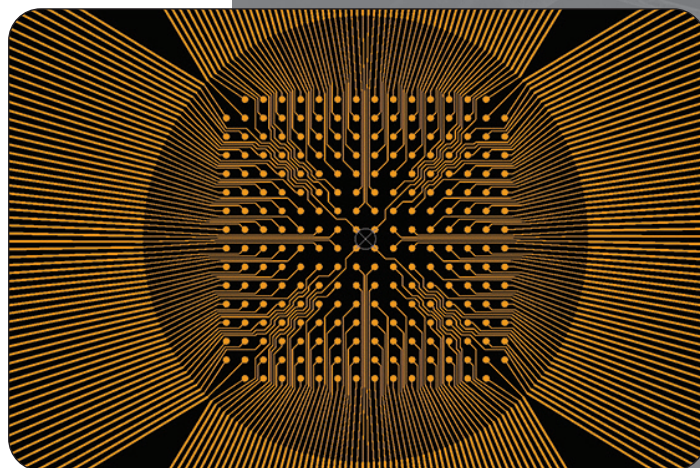
MEAs with 120 electrodes

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.

MEAs with 256 electrodes

MEAs with 256 electrodes are arranged in a 16x16 grid. There are MEAs with 30 μm , 60 μm , 100 μm or 200 μm electrode spacing and 8 μm , 10 μm or 30 μm electrode diameter available. 256MEAs are also available as ThinMEAs, which are ideally suited for high resolution imaging. To increase throughput further, there are also 6- and 9-well MEAs available. 具有256个电极的mea排列在16x16网格中。电极间距为30 μm 、60 μm 、100 μm 或200 μm ，电极直径为8 μm 、10 μm 或30 μm 。256mea也可作为thinmea，非常适合高分辨率成像。为了进一步提高吞吐量，还有6井和9井mea可用。



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	60-252 (depending on headstage type)
Bandwidth	0.1 Hz to 10 kHz
Stimulus generator:	
Number of stimulation channels	3 independent patterns per MEA slot (2 for MEA2100-HS256)
Available waveforms	rectangular, sine wave, arbitrary
Output current	± 1.5 mA
Output voltage	± 12 V

SPECIFICATIONS	
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 2.7.3 and higher
Multi Channel Analyzer	Version 2.7.3 and higher
Multi Channel DataManager	Version 2.1.0 and higher
Data export	HDF5 (*.h5) (Matlab, Python, R, etc.), NeuroExplorer (*.nex), Spike2 (*.smr), ASCII file (*.txt), European Data Format (*.EDF+)

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