



## Multiwell-MEA-System

High throughput electrophysiology

- 24- and 96-well plates with up to 1152 electrodes
- Up to 50 kHz sampling rate
- Integrated stimulator
- Different well plate variants
- 24 bit data resolution

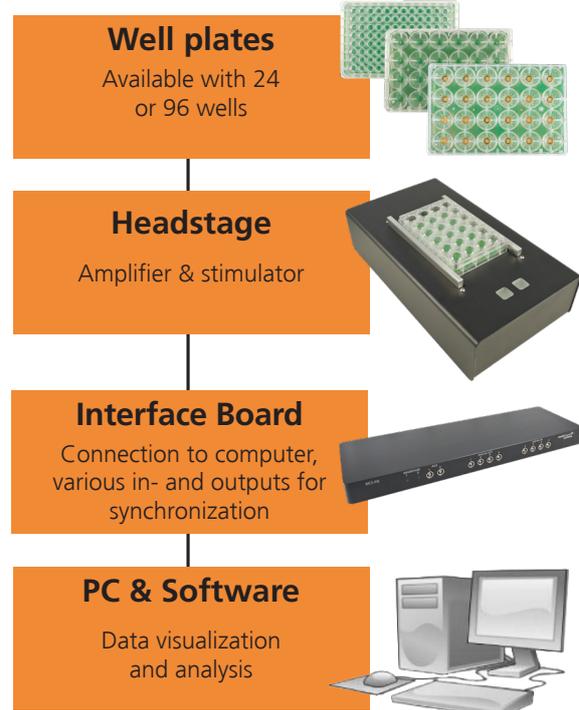
## High throughput electrophysiology for screening

Featuring a 24- and 96-well plate format, the Multiwell-MEA-System from Multi Channel Systems is the perfect tool for medium and high throughput electrophysiology. Being based on the MEA2100-technology, it includes high-quality, low-noise amplifiers, freely-programmable stimulators, and a digital signal processor for individual analyses.

One big advantage of the Multiwell-MEA-System is the high sampling rate. Your data is sampled at up to 50 kHz per channel. Thus, the accuracy of your data is guaranteed, whether you record from cardiac or neuronal samples.

### Set up

The Multiwell-MEA-System from Multi Channel Systems consist of 4 components:



### Well plates

Multi Channel Systems offers two kinds of well plates. The 24-well plate has 12 electrodes per well, arranged in a 4x4 grid. The 96-well plate features either 3 or 12 electrodes per well. In all well plates, there is an internal reference electrode in each well and each electrode can be selected for stimulation.

The base of the well plates is made of an opaque epoxy substrate or a transparent glass base, with substrate-integrated gold electrodes. In the 24-well plate version, there are also well plates with a transparent glass base with PEDOT-coated gold electrodes available.

On the bottom of the well plates, you will see the contact pads, which connect to the contact pins of the headstage.



## Multiwell headstage

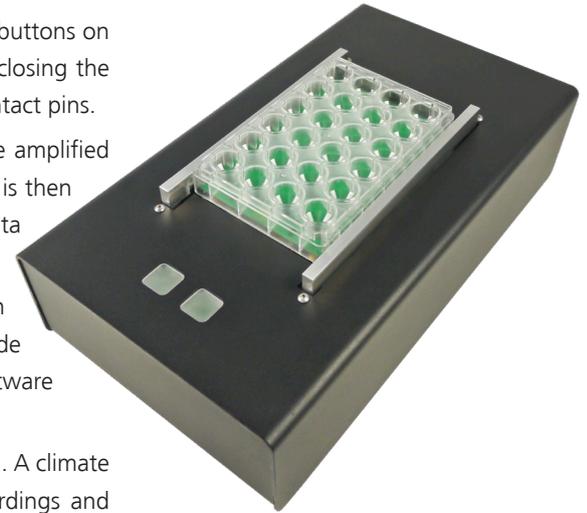
The headstage is the core element of the system. It houses the well plate, amplifies and digitizes the signals, and has an integrated stimulus generator.

The brackets can be opened and closed either by pushing the buttons on the housing or with a single mouse click in the software. By closing the brackets, the contact pads of the well plate connect to the contact pins.

The built-in amplifier makes sure that the recorded signals are amplified close to the signal source, thereby minimizing noise. The data is then sampled at up to 50 kHz/channel, ensuring an excellent data quality.

The headstage also provides an integrated stimulator, which can generate voltage stimulation signals. You can select any electrode for stimulation and design the signal shape via the included software Multiwell-Screen.

The recording chamber can be covered and has an inlet for CO<sub>2</sub>. A climate chamber with integrated Faraday cage allows noise-free recordings and control of pH, temperature and humidity. Additionally, it has an integrated temperature controller which regulates the temperature of the heating plate right below the wellplate.



## 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.

This perfectly combines both high resolution and high throughput electrophysiology.



## Data analysis with Multiwell-Screen software

The Multiwell-Screen software package is designed specifically for the needs of screening experiments with the Multiwell-MEA-System. In the beginning, you select whether you record from neuronal or cardiac cells, and then have a tool set specialized for your application.

With both tool sets, you can display your data in real-time on the entire well plate, zoom into one single well and see the signal on one single electrode. You can also filter the data (high-pass, low-pass, Butterworth, Notch etc.) and record digital events.

The software gives you the option to input information on the applied compounds and then calculates the corresponding dose-response curves automatically. Thereby, you can choose if you want to analyze your data for:

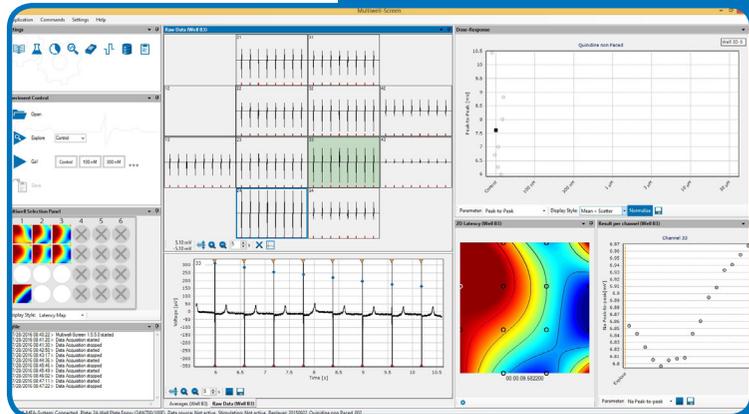
- Field-potential duration
- Slope
- Peak-to-peak
- RR-Interval
- Spike count.

Within the same software, you can design the stimulation patterns and decide when and where you want to stimulate.

The separate analysis software (Multiwell-Analyzer), which is also included in the system, provides further tools for detailed offline analysis.

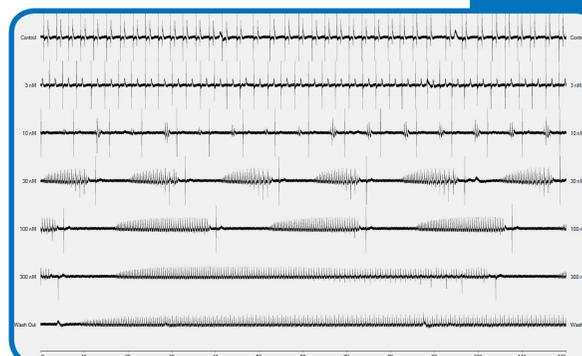
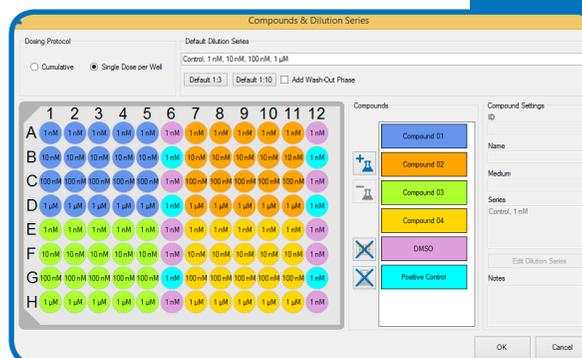
Both tools are designed for repeated screening experiments, so saving your settings and experimental layout is quick and easy.

As a policy at Multi Channel Systems, updates of the Multiwell Screen software package will be available online and free of charge, so you are always up-to-date with recent developments.



## Key features

- Automated report generation (dose-response data, raw data plots and overlay plots)
- CiPA compliant plate layout as predefined template
- Flexible export of results and raw data – Direct export into CiPA reporting forms
- Software supports single and cumulative dosing
- Automated locking mechanism – Easy to integrate into your existing liquid handling platform



Arrhythmia evoked by Dofetilide on Pluricyte® Cardiomyocytes. Courtesy of Pluriomics/Ncardia – Leiden, the Netherlands.

## Multiwell-MEA-System: Technical specifications

### General characteristics

Dimensions (W x D x H)	Headstage: 302 mm x 166 mm x 90 mm Interface board: 250 mm x 83 mm x 25 mm
Weight	Headstage: 4 kg Interface board: 0.3 kg

### Amplifier

Data resolution	24 bit
Number of recording channels	288
Bandwidth	0.1 Hz - 10 kHz

### Stimulus generator

Current stimulation	$\pm 500 \mu\text{A}$
Voltage stimulation	$\pm 10 \text{ V}$

### Data converter and USB interface

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

### Heating element and temperature sensor

Temperature sensor type	PT 100 with 4 wire connection
Accuracy of regulation	$\pm 0.1 \text{ }^\circ\text{C}$

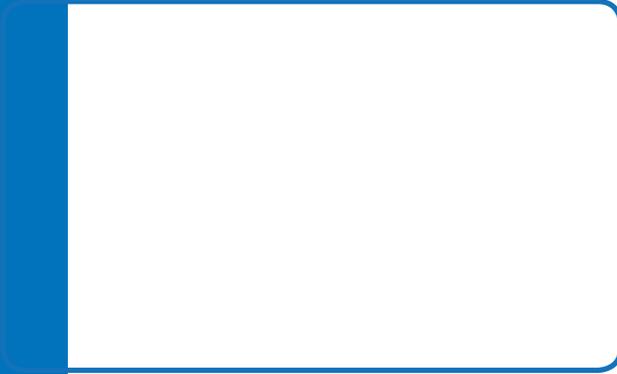
### Software

Operating system	Windows 8.1 (64 bit) (English and German versions supported)
Data acquisition	Multiwell-Screen, Version 1.5.6.0 and higher
Analysis software	Multiwell-Analyzer, Version 1.2.3.0 and higher

### Well plate variants

Type of well plate	Base material	Diameter of electrodes	Interelectrode distance (center to center)	Electrodes per well
24W300/30G-288	Glass	30 $\mu\text{m}$	300 $\mu\text{m}$	12 + 4 reference
24W700/100F-288	Epoxy	100 $\mu\text{m}$	700 $\mu\text{m}$	12 + 1 reference
96W700/100F-288	Epoxy	100 $\mu\text{m}$	700 $\mu\text{m}$	3 + 1 reference
96W400/80F-1152	Epoxy	80 $\mu\text{m}$	400 $\mu\text{m}$	12 + 2 references
96W700/100G-288	Glass	100 $\mu\text{m}$	700 $\mu\text{m}$	3 + 1 reference

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Multi Channel Systems  
MCS GmbH

Aspenhastrasse 21  
72770 Reutlingen  
Germany

Phone +49-7121-9 09 25 25  
Fax +49-7121-9 09 25 11

[sales@multichannelsystems.com](mailto:sales@multichannelsystems.com)  
[www.multichannelsystems.com](http://www.multichannelsystems.com)