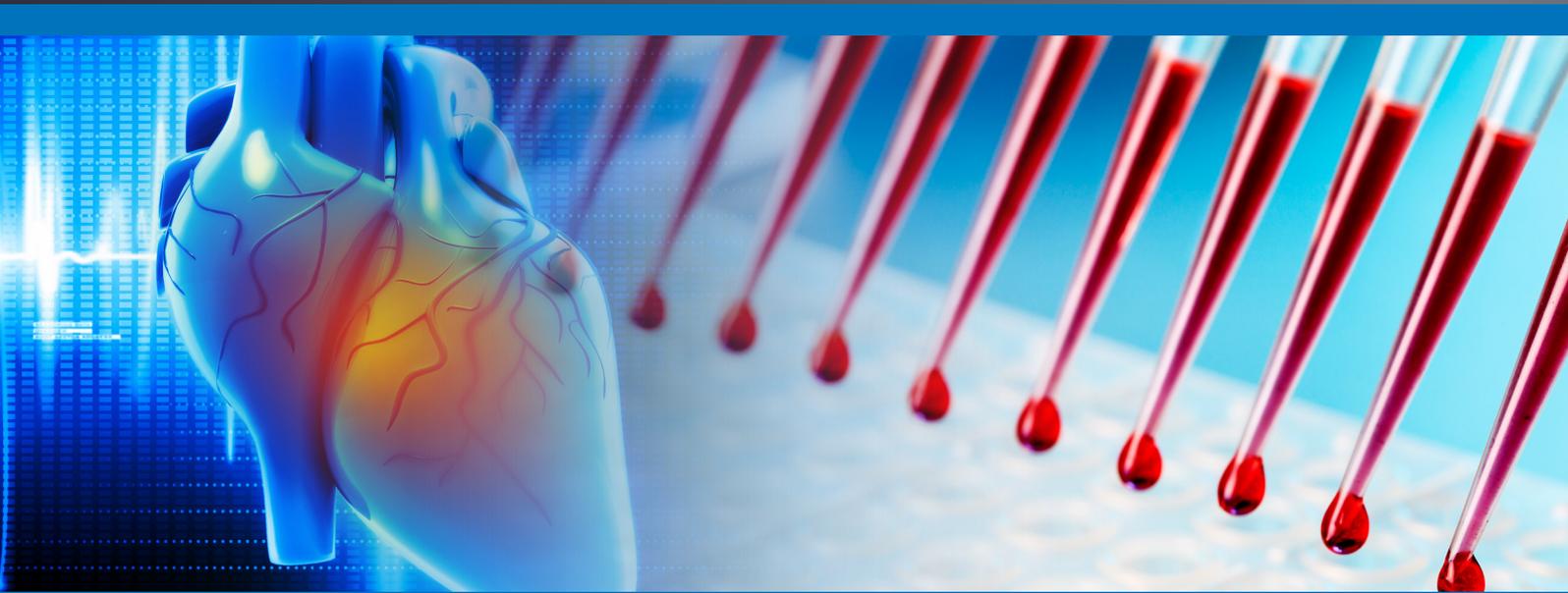


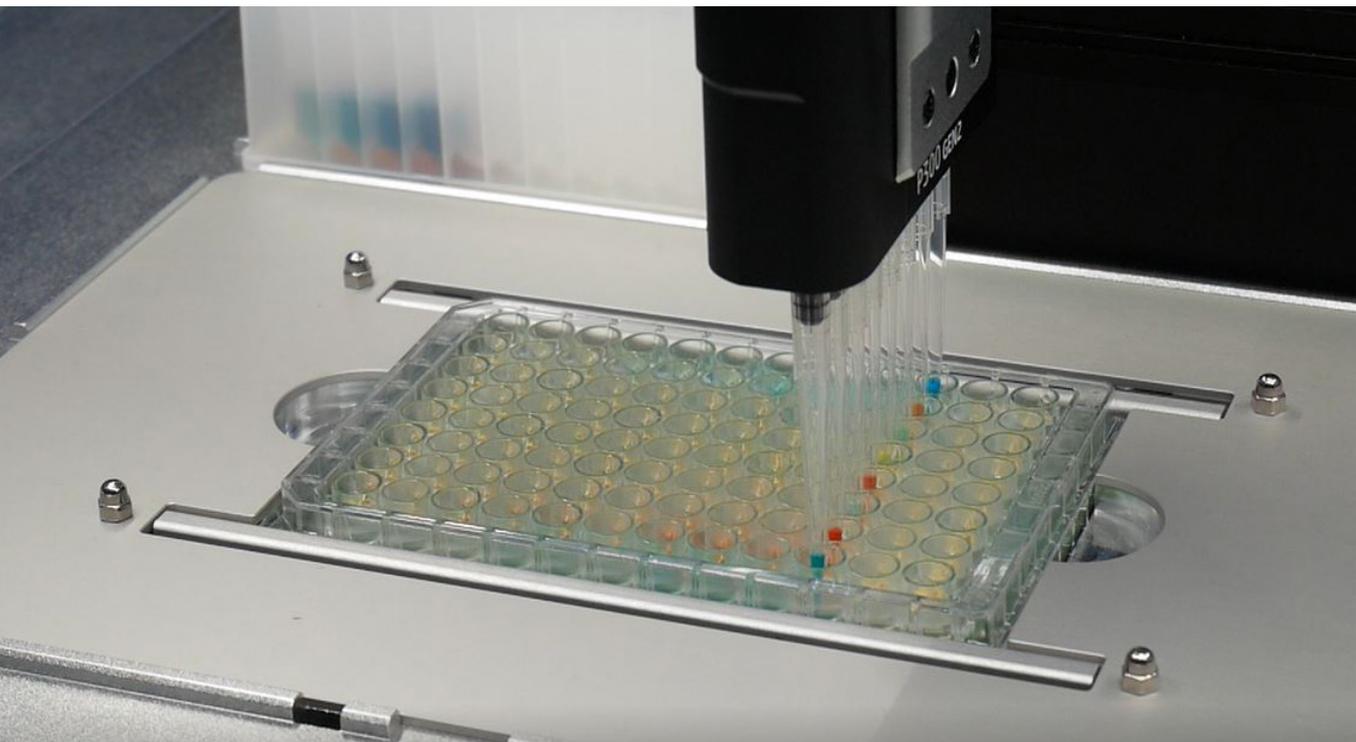
Multiwell-MEA-System & MEA Xpress

High Throughput MEA Electrophysiology
with Automated Compound Application



- Up to 50 kHz sampling rate, 24-bit resolution for the highest data accuracy in the field
- Integrated electrical and optional optical stimulation for activation, pacing and triggering
- Liquid handling integration for fast automated compound application to increase your experimental throughput
- 24- and 96-well SBS conformant MEA plates—glass or epoxy based for transparency and low consumable prices

High-Throughput Electrophysiology



Multi Channel Systems now provides an ideal tool for high throughput microelectrode array (MEA) electrophysiology. This solution bridges our best-in-class amplifiers with an automated compound administration platform to streamline your experimental workflow, saving time from the definition of the experiment through analysis of the recorded data.

Fast sampling rates of up to 50 kHz and the use of 24 bit ADCs result in precise signal detection and one of the highest dynamic ranges on the market. Whether you are recording slow signals with large amplitudes, such as those derived from primary Cardiac cultures, or fast signals with smaller amplitudes, such as those from iPSC or eSC derived neuronal cultures, our amplifiers facilitate the most precise signal recordings from all types of electrogenic cells.

When using the built-in stimulators the extensive voltage output range facilitates local short-term electroporation, and therefore electrical access to the cell's interior—yielding AP-like waveform detections.*

Select the optimal Multiwell-MEA plate for your experimental demand

Multi Channel Systems offers two types of well plates. The bases of our well plates are constructed from either an opaque epoxy substrate or a transparent glass base with substrate-integrated gold electrodes.



Our standard 24-well plates feature 12 electrodes per well with an opaque epoxy substrate base. This version is also available with a transparent glass base with PEDOT-coated gold electrodes.



The 96-well plates feature 3 electrodes per well. In all well plates, there is an internal reference electrode in each well and each electrode can be selected for stimulation.



Best practice is to use new multiwell plates for each recording. However, multiwell plates can be reused with proper cleaning and sterilization procedures at your own risk.*

* For further information, please refer to our Customer Application Notes on MEA AP Measurements and Multiwell MEA repeat use.



Multiwell Headstage

- The integrated MEA amplifier with its motorized locking mechanism amplifies and digitizes the signals coming from the electrodes on the multiwell MEA plate.
- The headstage features an integrated stimulator that allows current and voltage pulse stimulation on arbitrary electrodes. This allows for activation, pacing and triggering according to your experimental protocol.
- Maintain physiological conditions during your experiment by keeping CO₂ and temperature constant.



Optical Stimulation

MW-opto-STIM

- Our 24- and 96-well LED-stimulators allow for independent light activation and inhibition protocols in each well. Therefore, the 24- and 96-well optical stimulators allow you to make use of the emerging toolbox of optogenetics to trigger, suppress or synchronize cellular activity. Light pulse patterns are automatically co-recorded for easy data interpretation.
- High intensity LEDs in varying wavelengths meet the excitation spectrum of your channel protein. The opaque casting materials minimize well-to-well cross-talk.

Interface Board Multiboot

The Multiboot Interface Board facilitates operation of all MCS in vitro and in vivo headstages within the entire Multichannel Systems 2100 amplifier solution suite.

This suite includes: MEA2100-Mini-HS, Multiwell-MEA-HS, CMOS-MEA-HS, MEA2100-Beta-Screen-HS, W2100-HS and ME2100-HS.

This modular amplifier-family concept allows flexible experimental design and adaptations with minor hardware upgrade investments.

The Multiwell-MEA is part of the modular 2100 amplifier family, and connects to the latest generation of interface boards.



The Multiwell-MEA Software Package

Multiwell-Screen Software

The Multiwell-Screen software package is designed specifically for the needs of screening experiments using the Multiwell-MEA-System. Simply select the application type (neuronal or cardiac cells), and leverage the set of analysis tools matching your application.

For cardiac and neuronal applications, you can easily display your data in real-time on the entire well plate and you can zoom in as closely as a single electrode.

The software allows you to predefine information about the applied compounds, logs the information and then autocalculates the corresponding dose-response curves.

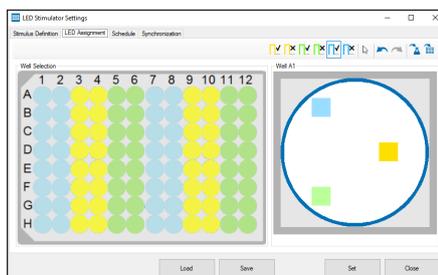
You can also design stimulation patterns and decide when and where you want to stimulate.

Key features

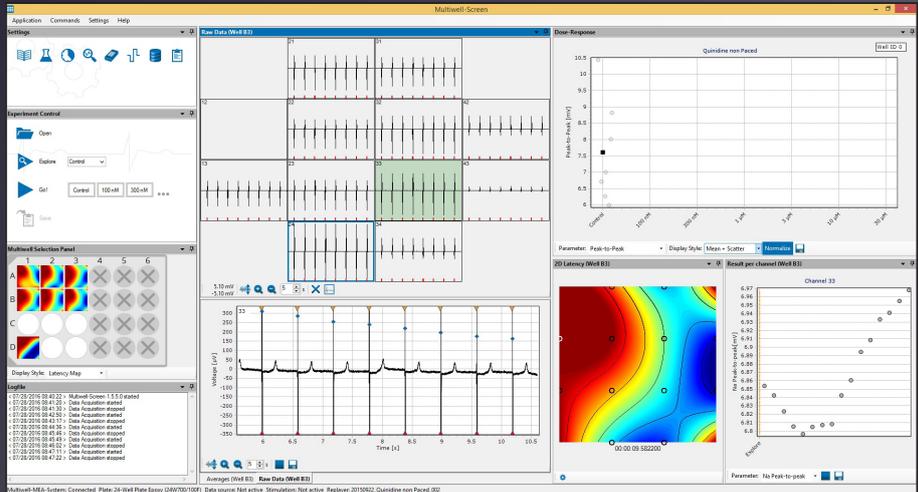
- **Automated report generation** (dose-response data, raw data plots and overlay plots)
- **CiPA compliant** plate layout available
- **Flexible export of results and raw data**—Direct export to CiPA standard format
- **Software supports single and cumulative compound administration**
- **Automated locking mechanism**—Smooth integration into the MEA Xpress liquid handling platform
- **Definition of independent illumination patterns** for opto-STIM device
- Software updates are available online and free of charge, to keep you up-to-date with recent developments

Multiwell-Analyzer Software

- The Multiwell-Analyzer software provides additional tools for detailed offline analysis.
- Both software tools are designed for repeated screening experiments, making saving parameter and analysis settings quick and easy.

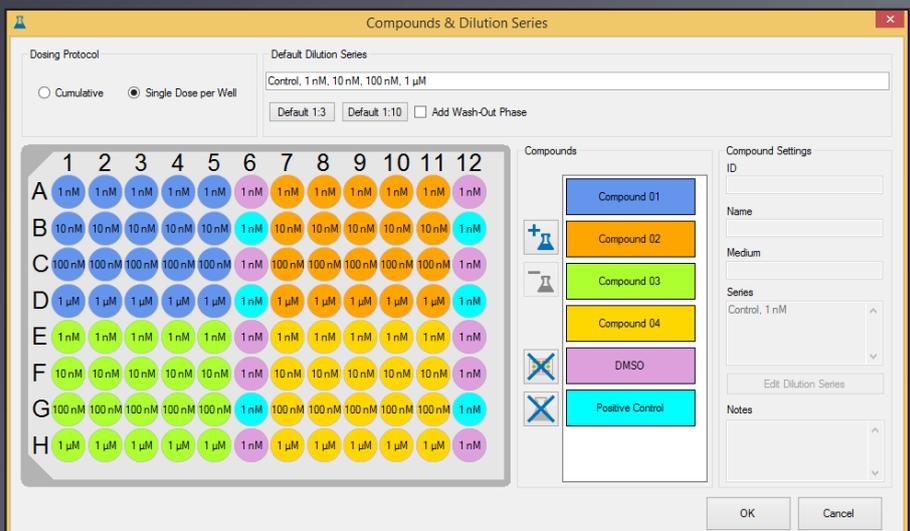


Opto-STIM interface

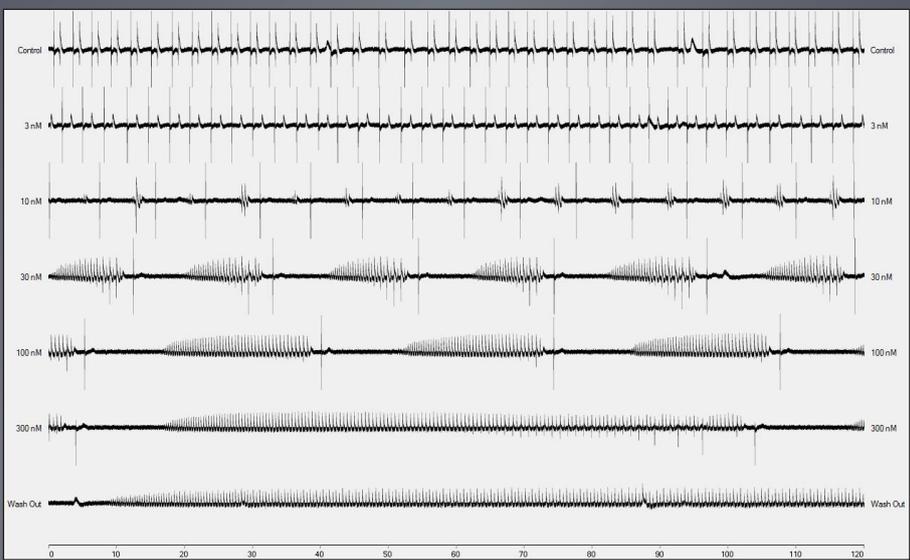


The software allows you to predefine information about the applied compounds, logs the information and then autocalculates the corresponding dose-response curves. Choose between different analysis parameters such as:

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



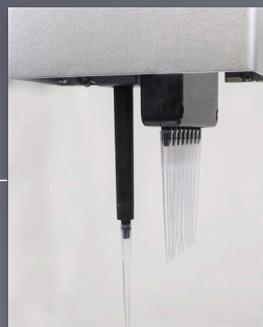
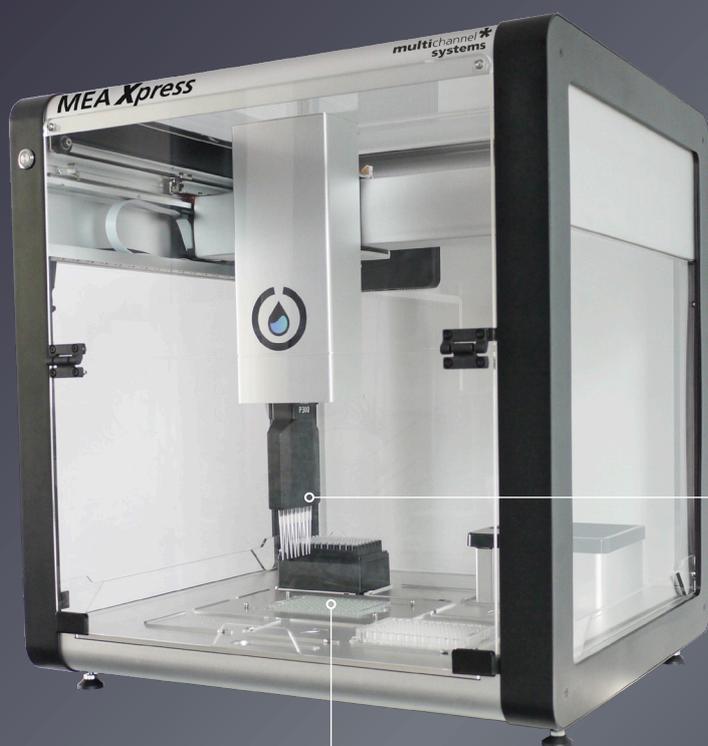
The software also delivers intuitive visual compound and dilution series definition.



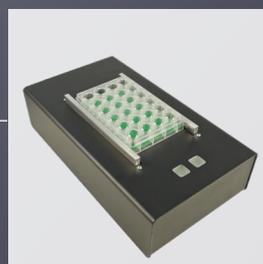
Arrhythmia evoked by Dofetilide on Pluricyte® Cardiomyocytes. Courtesy of Ncardia–Leiden, the Netherlands.

Add Liquid Handling To Your Multiwell-MEA Setup

MEA Xpress—The complete solution for multiwell, MEA recordings for automated liquid handling and compound application



Flexibility with two parallel pipette mounts (any combination of single- and 8-channel)

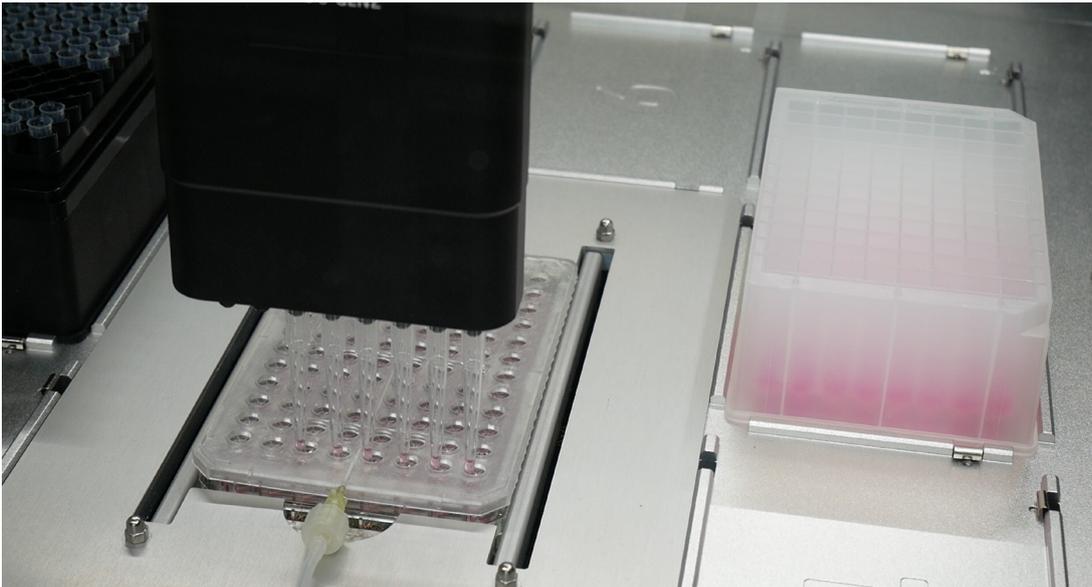


Integrated MEA amplifier in pipettor's baseplate

Your Benefits:

- Seamless integration of the pipetting protocol into the intuitive recording software allows smooth, fast and reliable data generation flow and proper experimental follow up
- Fast drug application addresses all wells in a 96-well plate— within 30 seconds
- Clean electrophysiologic data from your integrated Multiwell-MEA-System
- Atmosphere lid keeps CO₂ levels constant and minimizes evaporation for optimum physiologic conditions
- 24- and 96-well MEA plates available (all SBS-compliant)

Keep perfect physiological conditions
for each well during application



MEA Xpress PAL24/(-96)

The MEA Xpress PAL (pipettor atmosphere lid) seals the Multiwell-MEA plate during the experiment to guarantee ideal humidity, salinity and gas concentrations during the experiment. A integrated 9-channel gas superfusion outlet distributes premixed gas (like CO₂) to all wells of the plate. A star-slitted foil is penetrated by the pipette tip during compound application into the wells, and fully reseals after the retraction of the pipette-tip to maintain humidity (salinity) in each well. With this helpful accessory, long term recordings are doable within the pipettor — under perfect physiological conditions.

Specifications

MULTIWELL-MEA-SYSTEM SPECIFICATIONS			
Amplifier:		Integrated stimulator:	
Data resolution	24 bit	Max current output	± 500 µA
Number of recording channels	288	Max voltage output	± 10 V
Bandwidth	DC - 10 kHz, software selectable	Software:	
Sampling rate	Up to 50 kHz per channel	Operating system	Windows 10 (64 bit) (English and German versions supported)
Temporal resolution	20 µs		
Integrated temperature regulation (PT 100)	± 0.1 °C		

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 µm	300 µm	12 + 4 reference
24W700/100F-288	Epoxy	100 µm	700 µm	12 + 1 reference
96W700/100F-288	Epoxy	100 µm	700 µm	3 + 1 reference
96W700/100G-288	Glass	100 µm	700 µm	3 + 1 reference

MEA XPRESS SPECIFICATIONS			
Speed	As fast as 30 seconds to fill a 96-well plate	Number of pipette mounts	2 (for any combination of 1- and 8-channel pipettes)
Volume	1 - 1.000 µl (single channel) 1 - 300 µl (eight channel)	Accuracy (systematic error) Precision (random error) for default pipette models	Single-Channel (20 – 300 µl): < 5 % / < 2.5 %
Protocols	Pre-defined or customizable		Eight-Channel (20 – 300 µl): < 10 % / < 4 %



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