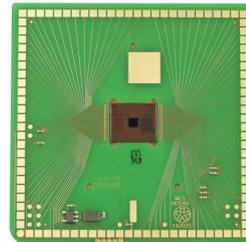


CMOS-MEA Chip

For Use with CMOS-MEA5000-System



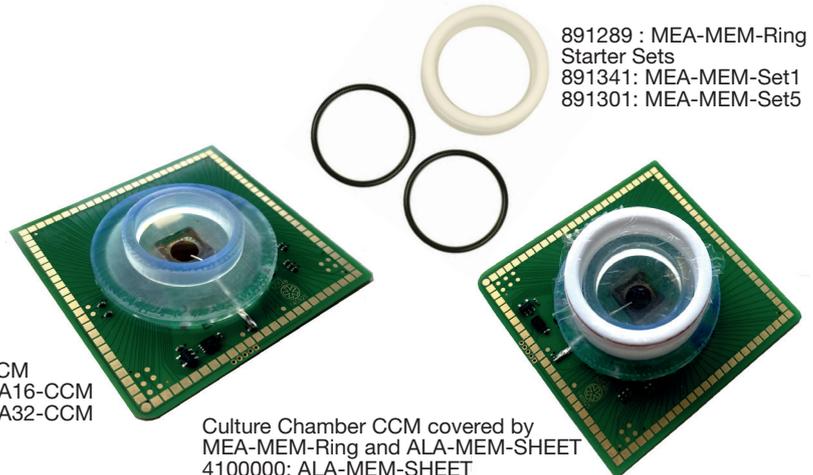
Technical Specification

General Characteristics	
CMOS-MEA chip	The CMOS-MEA chip is based on complementary metal oxide semiconductor (CMOS) technology.
Temperature compatibility	10 - 125 °C
Dimensions (W x D x H)	55 mm x 55 mm x 1.6 mm
CMOS-MEA Layout	
CMOS chip	ceramic surface
Base material	FR4
Weight	~ 17 g
Track material and contact pads	Bonding wires and Gold (Au)
Electrode diameter	8 µm
Electrode material	TiN electrodes (Titanium nitride)
Interelectrode distance (center to center)	16 µm or 32 µm
Active area	1.04 mm x 1.04 mm or 2.08 mm x 2.08 mm
Flat area (around active area)	rectangle: 7 mm x 8 mm or round: diameter 6 mm
Electrode height	Planar
Isolation material	FR4
Number of recording electrodes	4225 in 65 x 65 layout grid
Number of stimulation electrodes	1024 in 32 x 32 layout grid
Software	CMOS-MEA Control, CMOS-MEA Analyzer
Cleaning and Sterilization	
Cleaning	Rinse with distilled water, optional with ethanol 70 %.
Sterilization	Before using the CMOS-MEA chip, please sterilize the surface with UV radiation, for example, in a conventional flow box.
Warning!	It is not recommended to treat the CMOS chip in plasma cleaner! Extensive plasma treatment might damage the CMOS-MEAs. Keep treatment short and low power: 60 s at 0.2 mbar and 5 to 10 W. Autoclaving of CMOS-MEAs is possible, but not recommended as standard procedure.

CMOS-MEA Chip and Chamber



Slice Chamber SCG
891276: CMOS-MEA16-SCG
891277: CMOS-MEA32-SCG



Culture Chamber CCM
891374: CMOS-MEA16-CCM
891375: CMOS-MEA32-CCM

Culture Chamber CCM covered by
MEA-MEM-Ring and ALA-MEM-SHEET
4100000: ALA-MEM-SHEET

891289 : MEA-MEM-Ring
Starter Sets
891341: MEA-MEM-Set1
891301: MEA-MEM-Set5

Technical Specifications of the CMOS-MEA Chip and Chamber

CMOS-MEAs are not symmetrical!	Please take care for the correct orientation of the chip. The round edge of the CMOS-MEA has to be in the front on the left side when looking directly to the open CMOS-MEA headstage.
Slice Chamber SCG	Use the Slice Chamber SCG for acute slices on the CMOS-MEA chip. It has a flat rectangle area for placing the slice (7 mm x 8 mm) with influx and drain for intensive perfusion. The ground electrode is implemented in the base of the SCG chamber, an external Ag/AgCl electrode is not necessary.
Culture Chamber CCM	Use the Culture Chamber CCM with MEA-MEM-Ring for cell culture on the CMOS-MEA chip. It has a flat round area (diameter 6 mm) for the cell culture. It is possible to cultivate the cells on the chip in an incubator. A ground electrode is integrated in the CCM, an external Ag/AgCl electrode is not necessary. Please note: We recommend ordering the MEA-MEM-Set1 or MEA-MEM-Set5 as starter sets with your first order of CMOS-MEA-16/32-CCM chips. Such starter sets include MEA-MEM-Ring and ALA-MEM-SHEET products as well as a tool for putting the membrane sheet onto the ring. If required, additional MEA-MEM-Ring and ALA-MEM-SHEET products can be reordered.
MEA-MEM-Ring	Each MEA-MEM-Ring has two O-rings, an inner and an outer, both of the same size. The inner O-ring is used to seal the chamber against the wall of the culture chamber CCM, the outer one holds down and seals the foil ALA-MEM-SHEET. Use caution when installing the MEA-MEM-Ring, since the friction it creates can pull the ring off. To install the inner O-ring, simply push the O-ring into the inner groove until it is worked in all the way around. The MEA-MEM-Ring or MEA-MEM Starter Sets need to be ordered separately.
ALA-MEM-SHEET	(3"x 3" sheets of ethylene-propylene membranes) consist of special foil from DuPont, made of a Teflon polymer that is permeable to gases such as O ₂ and CO ₂ , but not water. This prevents contamination and minimizes medium loss by evaporation. Cultures can be removed from the incubator and observed without fear of contamination or drying out, and they can be cultured directly on heated CMOS-MEA-Systems. The membrane sheet can be replaced by hand, simply pulling the O-ring over it. Sterilize the ALA-MEM-SHEET by Ethylenoxid gas.
Cleaning	CMOS chips are gently cleaned with detergent Tickopur R36 (5%, Stamm/Berlin, 80 degC), and rinsed with ultrapure water (resistivity:18 MVcm). Fill hot Tickopur solution (80 °C) with a glass pipette into the CMOS MEA chamber onto the electrode field. Remove the Tickopur solution after 2 minutes by rinsing the chip with ultrapure water. Use a cotton swab for carefully cleaning the surface, if necessary. Please do not damage the surface mechanically, otherwise the chip will be destroyed. The following cleaning protocol was used in experiments with retina cells. Please read the paper which is online free available: Axonal Transmission in the Retina Introduces a Small Dispersion of Relative Timing in the Ganglion Cell Population Response from Guenther Zeck, Armin Lambacher, Peter Fromherz (2011).