



# BioCAM X

high resolution electrophysiology platform



# 4096 x 18kHz

Originating from 3Brain's expertise gained in the manufacturing of the first CMOS high-resolution multielectrode array, BioCam X will boost your research capabilities by enabling simultaneous recordings from a total of 4096 electrodes sampled at 18 kHz per electrode. You can either choose to store the entire raw signals captured by the BioCAM X or to take advantage of the several degrees of compression, which will allow you to save space on your hard disk and thus decrease computational resources required for further data processing.



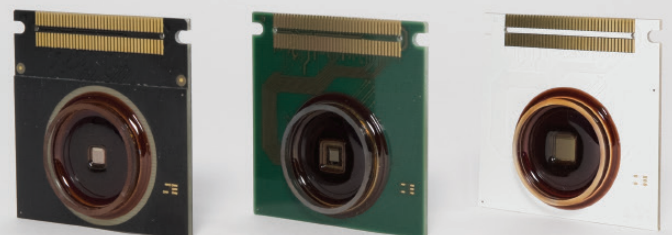
## ALL-IN-ONE

BioCAM X incorporates further optional functionalities in a compact and solid design, which come shipped as separate modules in most MEA-systems, such as a temperature control system and an electrical programmable current-driven stimulator. Its compact form factor eases the integration with other instrumentation like microscopes, perfusion and patch-clamp systems.

Thanks to its improved interface, BioCAM X can be controlled with a laptop for better mobility, allowing you to carry the entire recording system in your hand luggage.

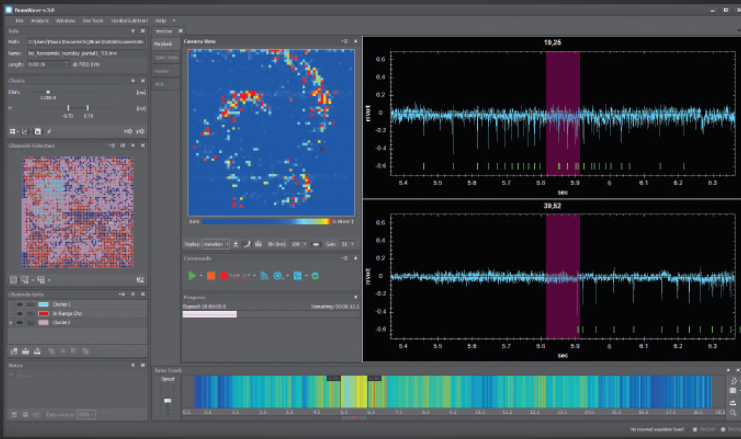
## CMOS HD-MEA

Whatever your experimental needs with multielectrode arrays are, BioCAM X can provide it! Its high sampling frequency and a user-selectable recording bandwidth make the system suitable to record any kind of electrophysiological signals, from slow field potentials to single action potentials. The three BioChip 4096 series provide different spatial resolutions and recording areas, allowing full monitoring of electrophysiological signals in a field of view up to  $\sim 26 \text{ mm}^2$  from a large variety of biological preparations, ranging from cell cultures to intact tissue such as brain slices and explanted retina.



# BRAINWAVE X

BioCAM X is supplied with the latest BrainWave X software version, which provides powerful visualization tools of electrophysiological signals during and after your experiments and stores all your data in HDF5 format. This standard (adopted by the International Neuroinformatics Coordination Facility) allows cross-platform compatibility and simplifies access to and from most common analysis environments such as Matlab® and Python™.



## INTEGRATED STIMULATOR

4 independently programmable current stimulator channels (routable to the BioChip and/or to the rear connector for use with your external stimulation electrodes)

## MAGNETIC PLATE

ferromagnetic stainless steel to attach magnetic perfusion holders

## ANTI-SPILL BAY

improved MEA connection system robust to accidental overflows of liquids

## LOCK SYSTEM

single two-position button for easy locking/unlocking of the BioChips

## TEMPERATURE CONTROL

integrated active temperature control

## SOLID AND DURABLE

fine and precise enclosure crafted from anodized aluminum make the BioCAM X robust to electromagnetic and mechanical noise





## TECH SPECS

### AMPLIFIER

bandwidth	0.1 Hz - 20 kHz
noise	11 $\mu$ Vrms (0.1 Hz - 20kHz)
maximum input-referred signal amplitude	4 mV

### MAIN CONTROLLER

data resolution	12 bit
number of recording electrodes	4096
full-array (4096) maximum sampling rate	18 kHz / electrode
region-of-interests	recording 1 up to 4 independent subsets of electrodes up to 64 kHz
temperature control	active heating and cooling between 34°C and 40°C
inputs	one TTL-level input (trigger/external control signal) and two LV-TTL GPIOs
control interface	Camera Link (mini SDR)

### STIMULATION MODULE (OPTIONAL)

stimulation mode	constant current
internal stimulation sites	16 on-chip (only for BioChip 4096E)
external stimulation sites	4 differential channels accessible on the rear connector
maximum current	+/- 1mA
stimulation patterns	up to 4 independent stimulation patterns
stimulus generator	programmable patterns (mono/biphasic, burst, jittering,...)
time resolution	10 $\mu$ s
amplitude resolution	10 $\mu$ A
maximum pulse rate	50 kHz

### SOFTWARE

OS	Windows Vista / 7 / 8, 64 bit
data processing	fully parallelized; AVX2 instruction set during online recording
file type	BRW (raw data) and BXR (results file) with plain HDF5 format
online recording modes	BRW with plain raw, lossless zipped raw, lossy raw; BXR
data export	MAT (Matlab); NEX (Neuroexplorer)

### PHYSICAL SPECS

body material	anodized aluminum / ferromagnetic stainless steel
dimensions (WxDxH)	160 x 205 x 38 mm / 6.3 x 8.07 x 1.5 inches
weight	approx. 1600 g / 3.53 lb