Technical specifications

8-channel Miniature Preamplifier (MPA8I):	
Dimensions (W x D x H)	17 mm x 25 mm x 2 mm
Weight	1.3 g w/o cable and plug
	21 g with cable and plug
Maximum tensile strength of cable	2 kg
Input connector type	Single-row precision sockets; 50 mil (1.27 mm) grid pattern for 0.35-0.45 mm round pins
Number of input channels	8
Input voltage	± 500 mV (with respect to a supply voltage of 5 V)
Input impedance	10^{12} Ω parallel to 10 pF
Input noise	< 1.5 μV_{RMS} (1 Hz to 5 kHz, inputs short-circuited)
Noise density	e_n = 15 nV/ √ Hz
Bandwidth	DC to 50 kHz
Gain	10
32-channel Miniature Preamplifier (MPA32I):	
Dimensions (W x D x H)	27 mm x 36 mm x 5 mm
Weight	7 g w/o cable and plug
	56 g with cable and plug
Maximum tensile strength of cable	2 kg
Input connector type	Dual-row precision sockets; 50 mil (1.27 mm) grid pattern for 0.35-0.45 mm round pins
Number of input channels	32
Input voltage	± 500 mV (with respect to a supply voltage of 5 V)
Input impedance	10^{12} Ω parallel to 10 pF
Input noise	< 1.5 μV_{RMS} (1 Hz to 5 kHz, inputs short-circuited)
Noise density	e_n = 15 nV/√ Hz
Bandwidth	DC to 50 kHz
Gain	10
Filter amplifier:	
Number of input channels	16 or 32
Input voltage	AC coupled
Input impedance	300 Ω
Input noise	< 1 μV_{RMS} (full bandwidth, inputs short-circuited)
Noise density @ 1 kHz	e_n = 9 nV/√ Hz
Bandwidth	1-5000 Hz *
Filter slope	80 db/decade
Gain	100 *
* Other gain and filter settings available on request	
Data acquisition:	
Sampling frequency	Up to 50 kHz/ channel
Data resolution	16 bit
Crosstalk (channel to channel)	Typically 0.01 %
Number of analog input channels	16 or 32
Number of digital input channels	16 TTL (CMOS 3.3V TTL Level)
Number of digital output channels	16 TTL (CMOS 3.3V TTL Level)
Interface and connectors:	
Analog inputs (16 channel version)	2 x 15 Pin Sub D for MPA8I
Analog inputs (32 channel version)	4 x 15 Pin Sub D for MPA8I
	1 x 37 Pin Sub D for MPA32I
16bit digital input and output	68 Pin SCSI-type
Data transfer	USB 2.0 High Speed (true USB 2.0 transfer rate)
External power supply:	
Input voltage range	100 - 240 VAC @ 47 - 63 Hz
Supply voltage	12 V DC @ max. 2.5 A
Supply current	max. 260 mA@12V (16 channel version)
	max. 390 mA@12V (32 channel version)
MC_Rack program:	
Operating system	XP, Vista or 7 (English and German versions supported)
Data export	Axon Binary File (*.abf), ASCII file (*.txt), binary file (*.raw) format; .NET DLL for use with your own software available

multichannel systems
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Universal Extracellular Recording Systems

- 16 or 32 channel version
- Pre- and filter amplifier included
- USB 2.0 data transfer
- Adapters to commercially available probes
- Real-time signal detection and feedback

multichannel systems
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The USB-ME-FAI-System fulfills three functions in one device:

1. **Signal amplification**

- Miniature preamplifiers with 8 and 32 channels available.
- Integrated filter amplifier: includes a common ground and one reference electrode input, which allows the measurement of the voltage difference between the electrodes and one reference electrode - providing a superior common-mode noise rejection.

2. **Data acquisition from 16 or 32 channels**

- 16 bit digital input and output.
- Sampling rate of up to 50 kHz per channel.
- Real-time sound output for software selectable channels.
- True USB 2.0 transfer rate.

3. **Online and offline analysis through included software**

- Flexible data stream management.
- Monitor parameters during the running experiment or re-run it any number of times.
- Software updates free of charge.

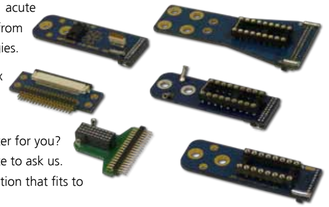
The USB-ME16/32-FAI-System is a complete plug-and-play data acquisition system based on signal processing technology.

- Includes all components you need to start your experiment immediately.
- Complete all-in-one solution for a variety of *in vivo* and *in vitro* applications.
- Easy installation saves time for your real objectives.
- No restriction to a certain computer with an extra interface board.
- Use this configuration in any lab of your choice.
- Any question? Take advantage of our more than 10 years of experience. Our support team will be open for all your queries.

You need a specific solution for your setup?

No problem. As a standard we can offer the following solutions for you:

- Adapters for many acute and chronic probes from NeuroNexus Technologies.
- Adapters for Matrix electrodes from FHC Inc.



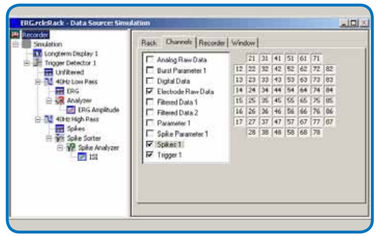
Do we have the right adapter for you? If not, please do not hesitate to ask us. We will certainly find a solution that fits to your needs, too.

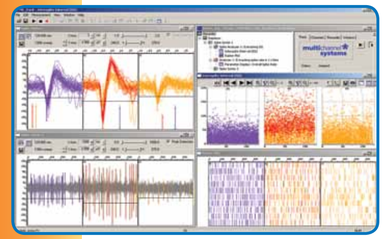
Flexible and easy to use software

The data acquisition and analysis program MC_Rack is highly adaptable with essentially unlimited possibilities.

For routine lab work, the program is set up like an instrument rack on a workbench:

- Combine virtual instruments (e.g. oscilloscope, filter, spike sorter, and many more).
- Virtual instrument rack: Use task-oriented template racks or design your own.
- Select any permutation of data streams for displaying, analyzing, exporting, etc.
- Extract parameters like spike rates in online or offline analysis.
- Apply several virtual filters with different cutoff frequencies e.g. to separate spike activity from local field potentials.





Online features of MC_Rack

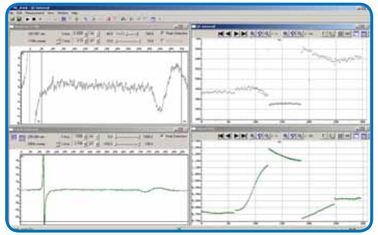
You can select any number of channels, record unmodified raw data, filtered data, and/or spike cutouts. The flexible data stream management makes all that possible.

Online filtering, spike sorting, local field potential (LFP) extraction, and triggering allow you to monitor parameters during the running experiment and save offline analysis time. And for ultimate experimental control, you can integrate the program controls (DLL) into your own custom software.

More flexibility is not possible.

Offline features of MC_Rack

Don't miss anything - review the raw data and extract additional parameters offline after the experiments. You can adjust spike detection or analyzer settings and re-run your experiment any number of times. Take the computer performance to the limit and extract multiple parameters in parallel, for example, signal rate, peak-peak amplitude, slope 10/90 % and more. Or separate different signal frequencies by virtual filters and analyze them separately.

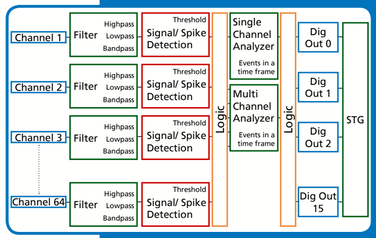


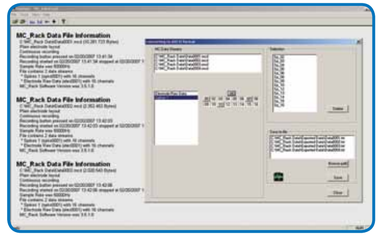
Real-time signal detection and feedback

By moving the analysis from the PC to the DSP (Digital Signal Processor) integrated in the USB-ME-System hardware, a real-time signal detection/feedback is possible. The real-time signal detection/feedback is an advantageous feature if you need fast and predictable reactions related to recorded analog signals without time delay.

The schematic view shows the principle of operation:

The DSP detects spikes/signals in the filtered data from each channel. You can define the criteria and time frame for the feedback. If your criteria apply, a digital output is generated, which can be used to trigger a stimulus generator or other external devices.





MC_Rack export features

You can easily export graphics as bitmap or ASCII directly from the software to your presentation or spreadsheet. Or just pick your favourite offline analysis tool. The data file format is compatible with various programs, like NeuroExplorer and Spike 2.

MC_Rack also supports Neuroshare- a universal file format for data recorded with electrophysiological methods as used e.g. by FIND (a novel tool for spike data analysis - http://find.bccn.uni-freiburg.de).

As an additional tool you can use the powerful data file handling of MC_DataTool: export raw data or spike cutouts from selected channels of interest as Axon Binary File (*.abf), ASCII file (*txt), or as binary file (*.raw).

Cardio 2D

Cardio2D is a software package to record cardiac data and analyze for spatial properties of cardiac signal propagation.

With the USB-ME-FAI-System it is possible to perform epicardial mapping recordings or map signal propagation in cardiac slices.

Cardio2D obtains false color coded maps with isochronous lines for local activation times. Conduction velocity is calculated automatically. Moreover, the software integrates the control of the stimulus generator.