



EPS 16 Probe Selector

Headstage Multiplexer



**If you believe your job is to
make new discoveries...**

...discover EPS 16:

- no performance reduction of amplifier circuitry
- compatible with single and multi patch clamp amplifiers
- individual holding potentials for non-selected probes
- fully integrated in the software PATCHMASTER
- automatic calibration

HEKA

HEKA provides the finest instruments today
to achieve the needed progress of tomorrow...

 **EPS 16 Probe Selector**
Headstage Multiplexer



HEKA is pleased to introduce the new EPS 16 PROBE SELECTOR. This headstage-multiplexing device is capable of turning an EPC 10 single patch clamp amplifier into a sixteen-channel serial patch clamp device.

Any of HEKA's EPC 10 multi-headstage amplifiers (EPC-10 Double, Triple or Quadro) can also be extended with the EPS 16. In these situations, the result will be a multi-channel patch clamp amplifier capable of combining both parallel and sequential recordings. The extent of parallel versus sequential extension will depend upon which multi-headstage amplifier the EPS 16 is combined with. For example, if one EPS 16 is used in combination with an EPC 10 Double patch clamp amplifier, the system will be able to record from 2 probes simultaneously (in parallel) and each of these can be multiplexed 8-fold resulting in 16 probes in total. A system based on the EPC 10 Quadro with one EPS 16 would be able to acquire from 4 probes in parallel with each of these being multiplexed 4-fold; again resulting in a total of 16 probes.

Patch clamp systems with up to 128 channels can be set-up using several PROBE SELECTORs in combination with given sets of EPC 10 Double, Triple or Quadro patch clamp amplifiers. For example, two, three or four EPS 16's can extend each channel of an EPC 10 Double, triple or Quadro respectively to generate systems with 32, 48 and 64 channels. Systems based on two EPC 10 Quadro patch clamp amplifiers can increase this number to 128.

These multi-patch systems are controlled through PATCHMASTER software and can also be incorporated into your custom automated patch clamp system by virtue of the Batch Control Interface offered by the PATCHMASTER software.

The combination of parallel and serial extension of the family of EPC 10 patch clamp amplifiers is of great benefit in that it minimizes total hardware costs and increases efficiency for specific applications. Firstly, purchasing an EPS 16 is a significantly cheaper alternative than purchasing multiple complete patch clamp amplifiers. Secondly, for applications such as screening experiments on ligand gated ion channels for example, the traditional waiting periods during washout of the substance can now be used efficiently by acquiring data from other cells

HEKA's fully computer controlled, digitally integrated patch clamp amplifier EPC 10 revolutionized patch clamp technology by providing unprecedented accuracy, highest degree of automation and versatility. HEKA's headstage multiplexing device, EPS 16 PROBE SELECTOR, further increases the throughput and enables the setup of multi-channel patch clamp systems with the EPC 10 family of amplifiers as the foundation.

Typical Configurations

Various combinations of EPC 10 main amplifiers and EPS 16 PROBE SELECTORS yield a different number of total recording channels.

Amplifier	Number of EPS16	Number of Channels
EPC10 Double	1	2 in parallel Each multiplexed by 8
EPC10 Quadro	1	4 in parallel Each multiplexed by 4

Combination of one multi-channel patch clamp amplifier with one probe selector.

Amplifier	Number of EPS16	Number of Channels
EPC10	1	16
EPC10 Double	2	32
EPC10 Triple	3	48
EPC10 Quadro	4	64
2 x EPC10 Quadro	8	128

Combination of patch clamp amplifiers with multiple probe selectors.

Main Features

The “selected” probe(s) of the EPS 16 PROBE SELECTOR behave like a probe connected directly to the EPC 10.

A LED on the front panel of the EPS 16 PROBE SELECTOR indicates the currently “selected” probe.

“Non-selected” probes will be held at their last holding potential before they were switched to the “non-selected” mode. The “non-selected” mode is always held in the medium gain range. Upon selection of a probe, the gain and holding potential specified at the corresponding amplifier is set. Calibration parameters for all probes are stored in a separate file.

The individual holding potentials for the non-selected probes are set via additional digital to analogue converters of the EPS 16 PROBE SELECTOR.

Pipette offset potentials and liquid junction potentials are taken into account when controlling the holding potential of selected and non-selected probes.

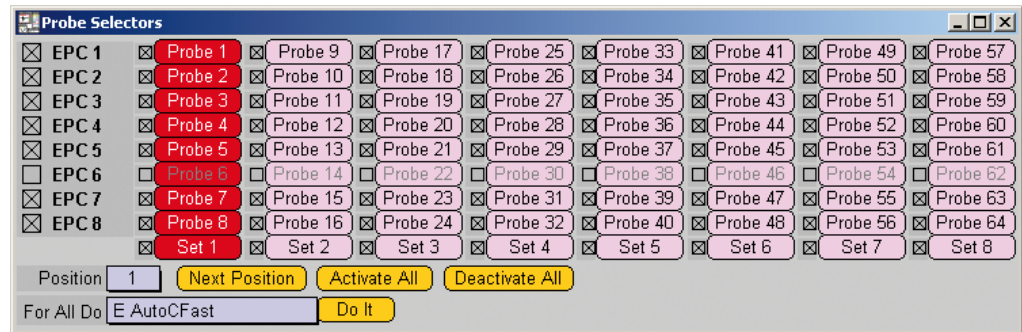
The probes connected to the EPS 16 PROBE SELECTOR can be automatically calibrated individually or all together in a complete calibration run. Calibration parameters for all probes are stored in a separate file.

→ EPS 16 Probe Selector Headstage Multiplexer

Software Control

In this screen shot the Probe Selector window is set for an 8 x 8 configuration. This hardware configuration consists of two EPC 10 QUADRO amplifiers and eight EPS 16 probe selectors with 8 probes each. Each probe number would reflect a recording location, chamber, channel or cell.

PATCHMASTER version 2.35 or newer is capable of supporting the EPS 16 PROBE SELECTOR. For manual control of the EPS 16 PROBE SELECTOR, PATCHMASTER provides a new Probe Selector window.



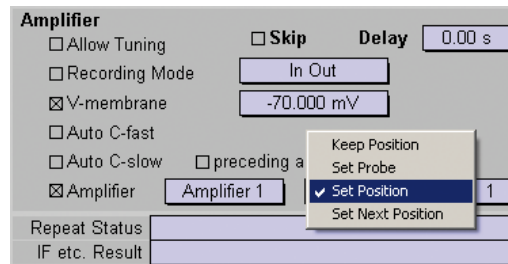
By selecting the “Set” buttons all amplifiers are switched to a specific position (column).

The “Next Position” button facilitates the switching of all amplifiers to the next column.

In order to skip data acquisition at individual probes, individual amplifiers or at complete sets of probes those items can be deactivated. The “Activate All” and “Deactivate All” buttons facilitate the change in the Probe Selector configuration.

Macro commands within PATCHMASTER can automatically be executed at all probes. This allows, for example, to perform an automatic CFast compensation at all 64 probes (see example above) with a single mouse click.

Amplifier event that allows control of the selection of the probe(s)



Alternatively, the PROBE SELECTOR can be controlled via MACROS or from within a PROTOCOL. The Amplifier function of the Protocol Editor can be used for probe selection.

PATCHMASTER software now offers two new “HT acquisition” modes that simplify the generation of the pulse generator sequence, the control of acquisition and the sorting and representation of the acquired data.

✓ HT-Template for Sequential Sweeps
HT-Template for Sequential Series

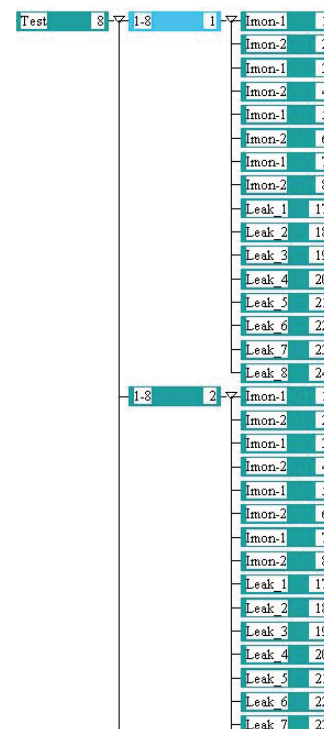
The HT-acquisition mode can be set in the pulse generator sequence. If the HT-acquisition modes are used, only a single DA/AD channel must be defined. This channel is then used for recordings from all probes.

If the mode is set to “HT-Template for Sequential Sweeps” a single sweep is first acquired from all probes (cells) before acquiring the second sweep.

If the mode is set to “HT-Template for Sequential Series” a complete series is acquired from the active probe (cell) before switching to the next probe.

P/n leak subtraction is supported in HT-acquisition mode.

In the Replay window each trace contains data from the probe/cell with corresponding probe number.



Technical Specifications

Dimensions and Weight Main Unit

D x W x H: (25.0 x 48.3 x 9.0) cm / (9.8 x 19.0 x 3.5) inch
mounts in 19" rack
Weight: 5,0 kg / 11 lbs

Power

operates on standard 115V / 230V

Dimensions Headstage

D x W x H: (90 x 17 x 14.5) mm / (3.54 x 0.67 x 0.57) inch

Software Requirements

Software support via PATCHMASTER since version 2.35

Switching times

When switching probes the entire calibration settings of the host amplifier board have to be adjusted to suit the new probe.
approx. 120 ms in combination with EPC 10
approx. 170 ms in combination with EPC 10 USB
Execution of a short stimulation and data acquisition sequence (e.g. a test pulse) on a complete set of e.g. 8 probes reveals cycle times of about 1.5s and 2.5s in combination with an EPC 10 and EPC 10 USB, respectively.



HEKA Elektronik
Dr. Schulze GmbH
Wiesenstraße 71
D-67466 Lambrecht/Pfalz
Germany

Phone +49 (0) 63 25 / 95 53-0
Fax +49 (0) 63 25 / 95 53-50
Web Site <http://www.heka.com>
Email sales@heka.com
support@heka.com

HEKA Electronics Incorporated
47 Keddy Bridge Road
R.R. #2
Mahone Bay, NS B0J 2E0
Canada

Phone +1 902 624 0606
Fax +1 902 624 0310
Web Site <http://www.heka.com>
Email nasales@heka.com
support@heka.com

HEKA Instruments Inc.
2128 Bellmore Avenue
Bellmore, New York 11710-5606
USA

Phone +1 516 882 1155
Fax +1 516 467 3125
Web Site <http://www.heka.com>
Email ussales@heka.com
support@heka.com

General notice:

Product names used herein are for identification purposes only and may be trademarks of their respective owners. HEKA disclaims any and all rights in those marks.

We reserve the right to effect technical changes as development progresses. Special versions are available on request. Further technical data are provided by a detailed description, which is available on request. A guarantee of one year applies on all instruments.