

Manual 2.1



Installation

of HEKA Hardware and Software

HEKA

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1. Introduction

There are three possible installation procedures:

1. Software only, e.g. PATCHMASTER
2. EPC 10 and software (PATCHMASTER)
3. LIH 8+8 or LIH 1600/ITC-1600 and software (PATCHMASTER, FITMASTER)

1.1 Installing Software only

Installing software typically requires two steps:

1. Installing the protection key ("dongle", chapter 4 on page 13)
2. Installing the required software (chapter 5 on page 15)

1.2 Installing EPC 10 and Software

Installing the EPC 10 patch clamp amplifier and the software requires five steps:

1. Making the physical connection between the EPC 10 and the computer (chapter 2 on page 5)
2. Installing the hardware driver (chapter 3 on page 11)

Note: *The EPC 10 USB (contains the LIH 8+8 INTERFACE) does not need any hardware driver installation by the user.*

3. Installing the protection key ("dongle", chapter 4 on page 13)
4. Installing the required software (chapter 5 on page 15)
5. Verifying the installation and testing the performance of the EPC 10 amplifier (see EPC 10 Manual, chapter **Verifying and Testing the EPC 10**)

PATCHMASTER provide the controls and the graphical representation of the amplifier by a "virtual panel" with "buttons". Signal display is provided by an oscilloscope-like display. PATCHMASTER provides the capability of data acquisition and analysis, but can also be used for calibration and self-testing the EPC 10. Please, consult the EPC 10 manual for details.

1.3 Installing Interface and Software

Installing the LIH 1600/ITC-1600 and software requires four steps:

1. Making the physical connection between the LIH 1600/ITC-1600 and the computer (chapter 2 on page 5)
2. Installing the hardware driver for Windows or Mac OS X (chapter 3 on page 11)

***Note:** The LIH 8+8 does not need any hardware driver installation by the user.*

3. Installing the protection key ("dongle", chapter 4 on page 13)
4. Installing the required software

1.4 Naming Conventions

Program Name: All software packages of HEKA use a common installation procedure. Therefore, throughout the present manual, we will address

the program to be installed as PATCHMASTER, as a place holder for the program you want to install.

EPC 10 Single, EPC 10 Double, EPC 10 Triple, EPC 10 Quadro and the 'USB' or 'PLUS' types: Throughout the present manual we will address all three amplifiers types as EPC 10. We will explicitly mention the particular amplifiers, where it is required.

LIH 1600/ITC-1600: For installation matters, the LIH 1600 and the ITC-1600 are handled identically. Exceptions are mentioned explicitly. The installation procedure for LIH 1600/ITC-1600 is identical to the EPC 10 procedure.

Windows versions: The EPC 10, LIH 1600, ITC-18, and PATCHMASTER are supported on: Windows XP, Windows 7 (32/64-bit) and Windows 8 (32/64-bit). Throughout the present manual we will address all the above Windows versions as "Windows". We will explicitly mention the particular Windows versions, whenever it is required.

1.5 Support Hotline

If you have any question, suggestion, or improvement, please contact HEKA's support team. The best way is to send us an e-mail specifying:

- Your postal address and e-mail address
- The program name: e.g. PATCHMASTER, FITMASTER
- The program version number: e.g. v2x65, v2x73.1
- Your operating system and its version: e.g. Mac OS 10.6, Windows 7 64-bit
- Your type of computer: Intel Core 2 Duo, Intel Core i5 2.5 GHz, Mac G4
- Your acquisition hardware, if applicable: EPC 10, LIH 1600
- Your amplifier, if applicable: EPC 10, EPC 10 Double

- The series number and version of your EPC 10, if applicable: EPC 10 Single, serial number '520552', revision letter 'R'.
- The questions, problems, or suggestions you have
- Under which conditions and how often the problem occurs

We will address the problem as soon as possible.

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2. Connecting the Hardware

2.1 Connecting the EPC 10 / LIH 1600 / ITC-1600

***Note:** The connecting procedure is identical for the EPC 10 patch clamp amplifier and for the standalone interfaces LIH 1600 and ITC-1600. Therefore we use EPC 10 as the synonym.*

When you receive the EPC 10, please check the packing list to verify that you have all required parts, especially:

1. The EPC 10 amplifier itself
2. The PCI-1600 computer interface card
3. Two fiber optics cables which will connect the EPC 10 to the computer interface card
4. The probe
5. The model cell (in the box with the probe)
6. The floppy disk or USB stick with the calibration files (in the box with the probe)

***Note:** There will be no calibration files included if you have an EPC 10 amplifier with the revision letter 'S' or more recent. The calibration files will be stored by default on the mainboard of the amplifier.*

First, shut down the computer, open it, and insert the computer interface card (PCI-1600) in a free, matching slot. If there is more than one free slot, place the card away from other cards radiating heat. Close the computer.

Insert the fiber optics cable into the connectors on the card you just inserted. Connect the other end of the cables into the connector labeled "To PCI-1600" at the rear of the EPC 10 or LIH 1600/ITC-1600.

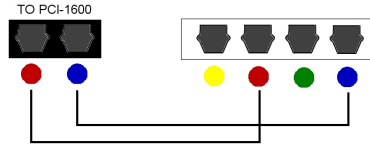


Figure 2.1: Connectors for optical cables

The EPC 10 offers the convenience that two interfaces can be connected to and controlled by a single PCI board in the computer. All input and output channels of the two interfaces are fully synchronized. Consequently, one can connect two EPC 10 amplifiers to one PCI interface card. The PATCHMASTER software detects both interfaces and uses e.g. the two amplifiers in the same way as an EPC 10 Double amplifier.

Color coding for connecting the EPC 10 to the LIH-1600 computer interface board:

Primary interface:	EPC 10	PCI-1600
	Red	Red
	Blue	Blue

Secondary interface:	EPC 10	PCI-1600
	Red	Yellow
	Blue	Green

Now connect the power cord to the EPC 10 and connect it to the power line.

Finally, place the EPC 10 in its final place and connect the cable of the probe to its "PROBE" connector on the front panel of the EPC 10 main unit. Make sure, that the amplifier is switched off, before connecting the probe.

The EPC 10 is now wired up, and you can proceed to the software installation as described in chapters 4 on page 13 and 5 on page 15.

2.2 Connecting the EPC 10 PLUS

When you receive the EPC 10 PLUS, please check the packing list to verify that you have all required parts, especially:

1. The EPC 10 PLUS amplifier itself
2. The PCI-18 computer interface card:
3. One shielded cable which will connect the EPC 10 PLUS to the computer interface card.
4. The probe
5. The model cell (in the box with the probe)
6. The floppy disk or USB stick with the calibration files (in the box with the probe)

***Note:** There will be no calibration files included if you have an EPC 10 PLUS amplifier with the revision letter 'Q' or more recent. The calibration files will be stored by default on the mainboard of the amplifier.*

First, shut down the computer, open it, and insert the computer interface card (PCI-18) in a free, matching slot. If there is more than one free slot, place the card away from other cards radiating heat. Close the computer.

Insert the shielded cable into the connectors on the card you just inserted. Connect the other end of the cable into the connector labeled "To PCI-18" at the rear of the EPC 10 PLUS.

Now connect the power cord to the EPC 10 PLUS and connect it to the power line.

Finally, place the EPC 10 PLUS in its final place and connect the cable of the probe to its "PROBE" connector on the front panel of the

EPC 10 PLUS main unit. Make sure, that the amplifier is switched off, before connecting the probe.

The EPC 10 PLUS is now wired up, and you can proceed to the software installation as described in the following section.

***Note:** The EPC 10 PLUS is supported by the software PATCHMASTER only.*

2.3 Connecting the EPC 10 USB

1. The EPC 10 USB can be installed into a standard nineteen-inch instrument rack or used as a desktop unit. If installing on a rack, please do not use the EPC 10 USB as a shelf to support any other instrument. The EPC 10 USB case was not designed to do this and damage to the front panel will result. To minimize noise, it is advisable to mount the EPC 10 USB away from devices that emit high-frequency signals (i.e monitors, power supplies, etc).
2. Connect the power cord to the EPC 10 USB. The internal power supply used in the EPC 10 USB is an auto switching multi-voltage supply that will operate from 90 Volts to 250 Volts. Make sure that the EPC 10 USB power cord is plugged into a properly grounded AC receptacle. Improper grounding of the EPC 10 USB could result in an electrical shock hazard. It is advisable to plug all equipment into a common outlet strip. This will minimize power line induced noise in the system.
3. Install the USB cable from the USB connector on the rear panel of the EPC 10 USB, labeled "USB", to an available USB 2.0 Hi-Speed port on the computer. This connection should be made directly to the computers USB 2.0 port and **not to an USB HUB**.
4. As soon as the EPC 10 USB is detected by the host operating system the appropriate system files will be initialized and the EPC 10 USB will be ready for use.

***Important note:** The host operating system treats the EPC 10 USB as it would any Flash memory device.*

Therefore, only standard operating system files are required. This provides ease of installation and flexibility for moving the EPC 10 USB from one computer system to another.

5. If multiple EPC 10 USB interfaces are to be connected, repeat the steps as outlined above for each unit. In addition, for the acquisition clocks to be properly synchronized, a connection between the Master clock output of one unit to the Slave clock input of the other (connectors located on the rear panel) must be made using standard CAT5 patch cables.

Important note: *Please note that the sync clock is a high-frequency signal. The shortest possible length patch cable should be used.*

6. Before powering up, please double-check all connections. If all connections are proper then the power LED will illuminate once the EPC 10 USB is powered ON.

Important note: *Please note that the Status LED will not be illuminated until the acquisition software has initialized the interface.*

The EPC 10 USB is now connected and ready to go.

Note: *There will be no calibration files included on a floppy disk or an USB stick if you have an EPC 10 USB amplifier with the revision letter 'R' or more recent. The calibration files will be stored by default on the mainboard of the amplifier.*

3. Hardware Driver Installation

Important note: On our website, www.heka.com, you will always find the latest version of all drivers and software packages.

3.1 EPC 10 / EPC 10 PLUS / LIH 1600 / ITC-1600

3.1.1 Windows

Important note: Windows does not allow you to install a driver, if you do not have administrative rights. Make sure to log-in as "Administrator" before performing any driver installation!

The plug-and-play system will automatically detect the PCI-1600 board (PCI-18 board in case of EPC 10 PLUS) and ask for an appropriate driver. Insert the HEKA CD into the CD-ROM drive and follow the instructions of the operating system. The drivers are located in the folder **Installers/Installer** for HEKA drivers. Finally, you should get the message, that the driver was successfully installed.

3.1.2 Mac OS X

On the Mac OS X operating systems, drivers for the hardware protection key ("dongle") and for the EPC 10 need to be installed. The installer for the EPC 10 amplifier can be found in the **Installers** folder and is

called `Install_HEKA_Drivers`. Please double-click on the installer icon to run the program.

3.2 EPC 10 USB

Upon connecting the EPC 10 USB to an USB port of the computer, the plug-and-play system will detect the amplifier and automatically install all required drivers. When using a Windows operating system an explorer window will pop up indicating that the interface (LIH 8+8) was successfully recognized.

4. Protection Key ('Dongle') Installation

To be able to use our PATCHMASTER software a protection key ('dongle') is required. We provide dongles for the parallel port (Windows only) and dongles for the USB port (Windows and Mac OS X).

***Important note:** On our website, www.heka.com, you will always find the latest version of all drivers and software packages.*

4.1 Parallel port dongle

Please insert the Rainbow protection key (labeled "SENTINEL Super-Pro") in the parallel printer port of your computer ("LPT1" or "LPT2"). If you have a local printer connected to your computer attach the key between the parallel port and the printer cable.

***Important note:** Windows does not allow you to install a driver, if you do not have administrative rights. Make sure to log-in as "Administrator" before performing any driver installation!*

To install the protection key driver go to the Tools & Drivers section of the HEKA installation CD and click on the *Parallel port Dongle* icon. Alternatively you can open the folder *Installers/Installer for SENTINEL drivers* and execute `SentinelProtectionInstaller.exe`.

4.2 USB port dongle

***Note:** Please install the USB dongle drivers **before** connecting the USB dongle. After successfully installing the driver, the USB dongle can be connected.*

After the successful installation of the dongle drivers the red LED of the USB dongle should light up continuously.

4.2.1 Windows

To install the protection key driver go to the Tools & Drivers section of the HEKA installation CD and click on the *USB Dongle* icon. Alternatively you can open the folder `Installers/Installer` for HASP drivers and execute `HASPUserSetup.exe`.

4.2.2 Mac OS X

To install the protection key driver go to the folder `Installers/Installer` for HASP driver on the HEKA installation CD and execute the file `HASP_SRM_RTE.Installer.dmg`.

5. Software Installation

Now, you can install and run the acquisition software PATCHMASTER; for hardware/software compatibility please refer to the description of the software packages or contact the HEKA support hotline.

***Important note:** On our website, www.heka.com, you will always find the latest version of all drivers and software packages.*

5.1 Windows

In the section "Installation" of the installation screen you will find our main software packages. Click on the PatchMaster icon to start the installation process.

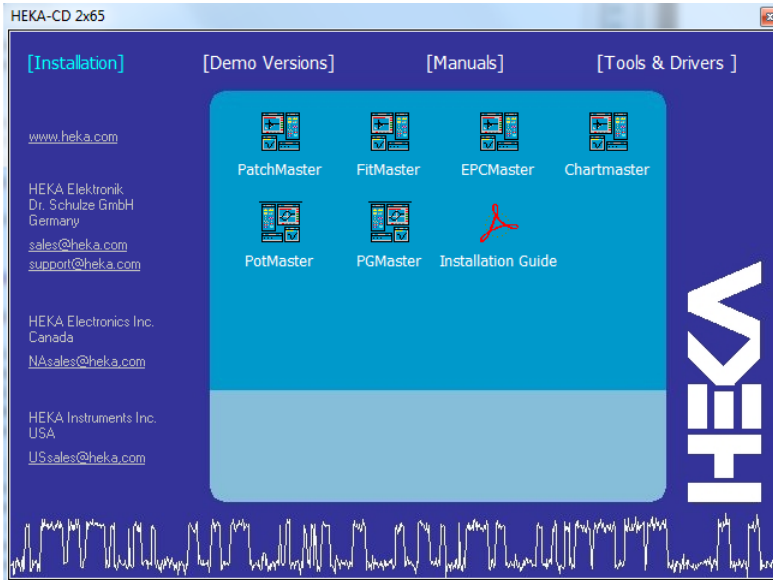


Figure 5.1: Installation screen

Note: If the HEKA installation program should not start automatically e.g. for the installation of other software packages, run the driver installation software (*start.exe*) from the HEKA CD.

5.2 Mac OS X

In the **Installer** folder of the installation CD you will find the installer for the PATCHMASTER software (*Install_PatchMaster*). Execute this file to start the installation process.

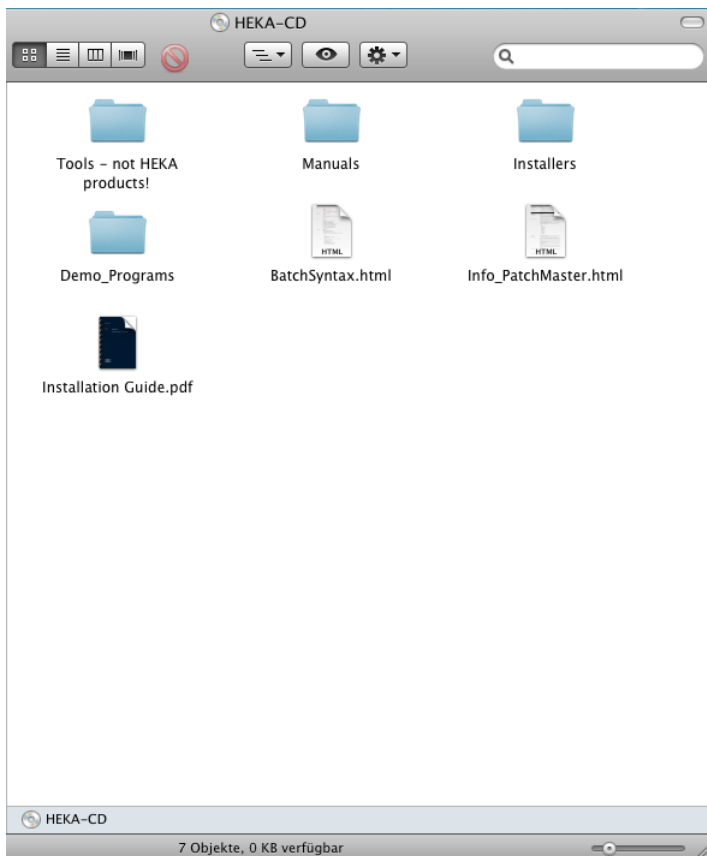


Figure 5.2: Installation screen

6. Calibrating the EPC 10

A calibration of the new amplifier is usually not necessary, since you can use the calibration files supplied by HEKA. However, it is advisable to re-calibrate the EPC 10 twice a year or whenever the frequency response of the amplifier is not accurate or offset currents become noticeable.

***Note:** The calibration file contains the settings of the digital switches and controls of the amplifier. These are unique to a given combination of amplifier and probe and cannot be used for another EPC 10. Therefore, you have to re-calibrate the amplifier, when you replace the probe! This is a big advantage of the EPC 10, since you can use any EPC 10 probe with any amplifier and replace a broken probe without having to send the amplifier in for re-calibration.*

Before starting the calibration make sure that the amplifier has reached its operational temperature, since the calibration depends on temperature. We advice to let the EPC 10 warm up for 30-60 minutes after powering the amplifier on. The calibration procedure can be performed with PATCH-MASTER. In the program, go to the EPC 10 menu → **Test and Calibrate** → **Calibrate**.

The software will warn you that this procedure may take up to 10 minutes, depending on the speed of your computer. Go ahead by clicking the "Yes" button.

Then you are instructed to remove anything from the probe and shield its input: You can use the metallic cap that came with your EPC 10 and put it on the BNC connector of the probe to shield it. Please make sure that really nothing except the metallic cap is connected to the probe (the black GND pin jack should be free) and that no BNC cables are connected to the inputs and outputs of the EPC 10!

At the end of the calibration, the software will let you know, whether the calibration succeeded or failed. If it succeeded, the program will automatically generate a new calibration (scale) file (SCALE_XXXXXX.EPC) and the C-fast Lookup Table (CFAST_XXXXXX.EPC). The files will be stored by default on the mainboard of the EPC 10 amplifier (EEPROM).

***Note:** To store these file on your hard drive of your PC please go to the EPC 10 menu → Test and Calibrate and change the default setting from Scale from/to EEPROM to Scale from/to Disk.*

***Note:** It is not advisable to change the name of the files, because in that case you would have to manually load the files during every initialization. It is very advisable to store the files only in the one place.*

Finally, the software re-initializes the amplifier.

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