

# PATCHMASTER Basics

## Training Webinar

If you have any Patch-Clamp related questions or comments,  
please feel free to send an email to the HEKA Support Team at:

**[support@heka.com](mailto:support@heka.com)**



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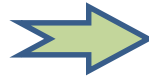
# Overview

- **PATCHMASTER – Simple Handling & Easy Work Flow**
- **Installation Procedure (PATCHMASTER & EPC10\_USB)**
- **PATCHMASTER – Windows (Purpose & Function)**
  - **Graphical User Interface (GUI)**
  - **Amplifier**
  - **Oscilloscope**
  - **Replay**
  - **Pulse Generator**
  - **Analysis (online & offline)**
  - **Protocol Editor (“Assistant”)**
  - **Control**
- **PATCHMASTER – Record, Display, Save and Analyze Data**

# PATCHMASTER – Simple Handling & Easy Work Flow




Scientists



**AUTOMATIC CONTROL** Protocol Editor  
Manages & controls entire experiment

MANUAL CONTROL

**P** Parameters: Input / Readout



**Amplifier**  
Controls Patch-Clamp amplifier


**Pulse Generator**  
Creates stimulus files and sets DA and AD channels

**Control**  
Easy access to experiment controls & info

**Online Analysis**  
Online analysis of live data recording

- Configuration
- I/O Control
- Extensions
- Solution Base / Changer

**I** Information: Readout



**Oscilloscope**  
Displays data live & recorded

**Notebook**  
Keeps written record of entire experiment

**Replay**  
Displays data live & recorded

- Analysis display
- Parameters

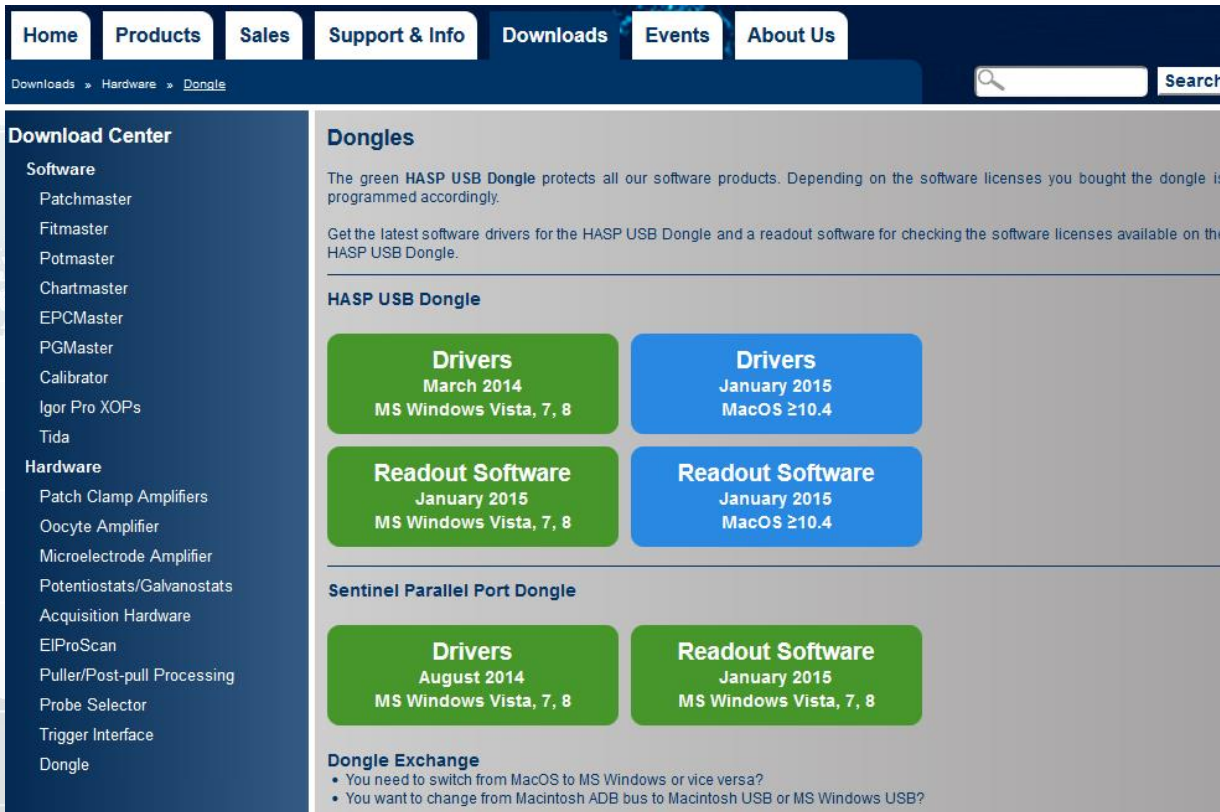
# Installation Procedure

- ❑ Hardware Installation: Plug-in EPC10\_USB to direct USB port (PC or Mac)
- ❑ Download (www.heka.com) & install driver for protection key (dongle)
- ❑ Download & install PATCHMASTER
  - Run “Installer.exe” as administrator
  - 1<sup>st</sup> time run “PATCHMASTER” as administrator, afterwards not required

(Example: PC)



Illuminated LED indicates “fully functional”



**Download Center**

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**Download Center**

**Software**

- Patchmaster
- Fitmaster
- Potmaster
- Chartmaster
- EPCMaster
- PGMaster
- Calibrator
- Igor Pro XOPs
- Tida

**Hardware**

- Patch Clamp Amplifiers
- Oocyte Amplifier
- Microelectrode Amplifier
- Potentiostats/Galvanostats
- Acquisition Hardware
- EIProScan
- Puller/Post-pull Processing
- Probe Selector
- Trigger Interface
- Dongle

**Dongles**

The green HASP USB Dongle protects all our software products. Depending on the software licenses you bought the dongle is programmed accordingly.

Get the latest software drivers for the HASP USB Dongle and a readout software for checking the software licenses available on the HASP USB Dongle.

**HASP USB Dongle**

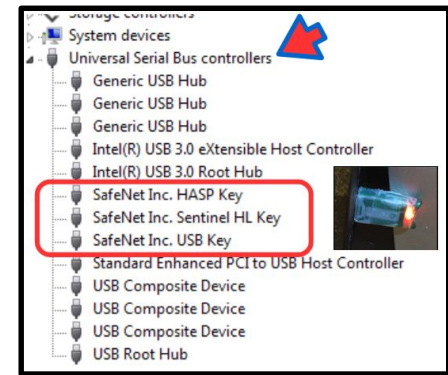
<b>Drivers</b> March 2014 MS Windows Vista, 7, 8	<b>Drivers</b> January 2015 MacOS ≥10.4
<b>Readout Software</b> January 2015 MS Windows Vista, 7, 8	<b>Readout Software</b> January 2015 MacOS ≥10.4

**Sentinel Parallel Port Dongle**

<b>Drivers</b> August 2014 MS Windows Vista, 7, 8	<b>Readout Software</b> January 2015 MS Windows Vista, 7, 8
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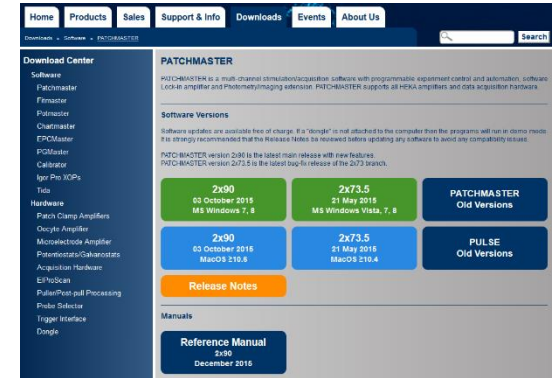
**Dongle Exchange**

- You need to switch from MacOS to MS Windows or vice versa?
- You want to change from Macintosh ADB bus to Macintosh USB or MS Windows USB?

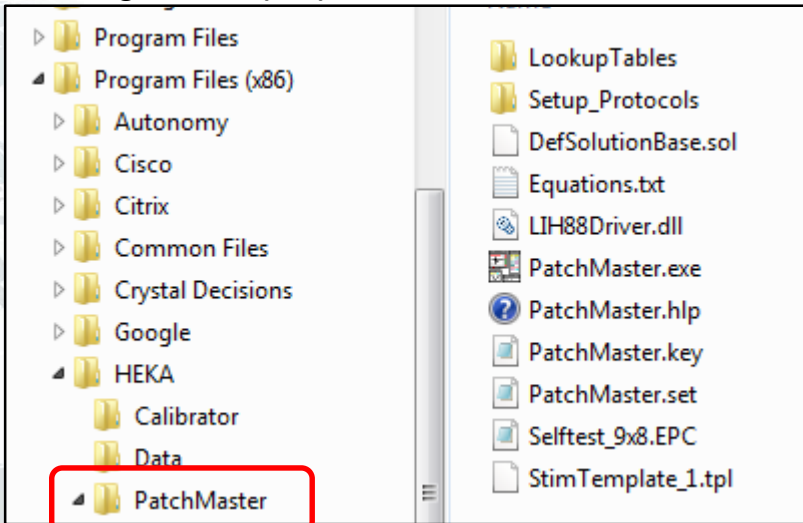


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C:\\Program Files (x86)\\HEKA\\PatchMaster



## Important Files:

- PATCHMASTER.exe
- PATCHMASTER.set
- Default Files
  - Online Analysis (onl)
  - Pulse Generator (pgf)
  - Protocol Editor (pro)
- Other Files

# PATCHMASTER – Graphical User Interface

- ❑ Different windows for different functions
- ❑ Fully customizable and modifications are automatically saved in the PATCHMASTER.set file (Save & Exit)

**Main Menu**



The screenshot shows the PatchMaster software interface with several windows and callouts:

- Amplifier** (left panel): Control & Set parameters for the amplifier, including Gain (1 mV/pA), V-membrane (0.0 mV), and Test Pulse settings.
- Oscilloscope** (center): Display data (live & stored) showing a step function waveform.
- Replay** (top right): Easy data access window showing a list of recorded traces.
- Notebook** (bottom right): Create written record window showing a text log of the experiment.
- Control** (bottom): Easy access to applications window showing the current protocol and application settings.

# PATCHMASTER – Graphical User Interface

- ❑ Different windows for different functions
- ❑ Fully customizable and modifications are automatically saved in the PATCHMASTER.set file (Save & Exit)

“Windows” menu

The screenshot shows the PatchMaster software interface with several key components highlighted:

- Windows menu:** A red arrow points to the 'Windows' menu in the top-left corner.
- Amplifier - Control & Set:** A red box highlights the left-hand sidebar containing various control options like 'Control Window', 'Configuration', 'Oscilloscope', and 'Pulse Generator'.
- Display:** A red box highlights the central plot area showing a waveform.
- Pulse Generator - Create Stim. Sequences:** A red box highlights the 'Pulse Generator File: DefPgf' window, which includes a 'Full View' tab, a sequence of pulse types (IV, Chart, Ramp, Continuous, CC, CC Inject), and a table for defining segments and channels.
- Easy access to applications:** A red box highlights the bottom-right area of the interface, which includes buttons for 'EXECUTE' and 'CHECKING'.

The 'Pulse Generator' window contains the following data tables:

Timing	No wait before 1 Sweep	Not Triggered	Checking	EXECUTE
No of Sweeps	10	Use Durations	Sweep Length	Total
Sweep Interval	0.00 s	StartSeg	70.00 ms	Stored
Sample Interval	20.0 $\mu$ s (50.0kHz)	StartTime	70.00 ms	14000 pts
			Channel Length	Stimulus
			70.00 ms	3500 pts

1	DA	Unit	Stimulus -> DA	Leak	AD	Unit	Link	Compr.	Points	Store	Zero	Leak
Ch-1	Stim-1	V	StimScale		Imon-1	A	1	1	3500		1	No Leak
Ch-2	Stim-2	V	StimScale		Imon-2	A	2	1	3500		1	No Leak
---	off	---	absolute voltage		---	---	---	---	---		---	No Leak
---	off	---	absolute voltage		---	---	---	---	---		---	No Leak

Segments	1	2	3	4	5	6	Common Timing
Segment Class	Constant	Constant	Constant	Constant	Constant	Constant	Voltage Clamp
Voltage [mV]	holdV-memb	val -60	holdV-memb	val ---	val ---	val ---	Filter Factor
Duration [ms]	val 10.00	val 50.00	val 10.00	val ---	val ---	val ---	Analysis: (Edit)
V-incr. Mode	Increase	Increase	Increase	Increase	Increase	Increase	Rel X-seg
V-fact./incr. [mV]	1.00	0	1.00	10	1.00	0	2
t-incr. Mode	Increase	Increase	Increase	Increase	Increase	Increase	Rel Y-seg
t-fact./incr. [ms]	1.00	1.00	1.00	0.00	1.00	0.00	2



# PATCHMASTER – Amplifier Window

- ❑ Full Control: EPC9, EPC10 and EPC800 amplifiers (iTEV90)  
(limited control (through telegraphing outputs): EPC7, EPC8, AxoPatch, Warner PC-505, etc.)
- ❑ Controls: Gain, V- and I-membrane, mode, test pulse, compensation, filter, etc.
- ❑ Can be fully controlled by Protocol Editor (PE) & reports values to PE and online Analysis

**Color coding four different functions:**

- Drop-down window
- Enter value
- Auto or Enter Value
- Display only

**Gentle CC-Switch**

- Enables or disables “Gentle Switch” function
- Keeps Vm unchanged when switching to CC by injecting the appropriate amount of current
- Save & Easy switch between VC and CC mode





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Feedback Resistor: **5 MΩ**  
I-max: **± 2 μA**  
C-slow range: **30 – 1000 pF**  
CC mode: **yes**  
Rs compensation: **yes**

Feedback Resistor: **500 MΩ**  
I-max: **± 20 nA**  
C-slow range: **30 – 1000 pF**  
CC mode: **yes**  
Rs compensation: **yes**

Feedback Resistor: **50 GΩ**  
I-max: **± 200 pA**  
C-slow range: **30 – 100 pF**  
CC mode: **no**  
Rs compensation: **yes**

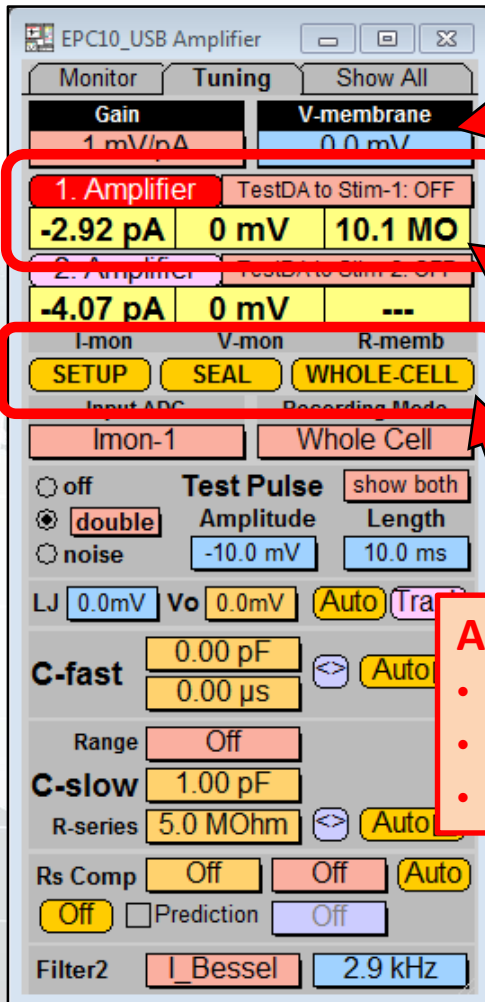


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## V-membrane (I-membrane)

- Sets “holding potential (Vh)” (V-Clamp) or
- Sets “holding current (Ih)” (C-Clamp)

## Display (V-Clamp / C-Clamp)

- LEFT: Injected current amplitude / holding current (Ih)
- MIDDLE: holding potential (Vh) / membrane potential
- RIGHT: Membrane resistance (Open to bath: pipette res., CAP: seal res.)

## Auto Buttons – set parameters for different configuration states

- SETUP: compensates any offsets
- SEAL: compensates pipette capacitance (C-fast) + set Vh
- WHOLE-CELL: compensates cell capacitance (C-slow) and serial resistance (Rs)



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In Out  
On Cell  
Out Out  
 Whole Cell  
C-Clamp

PATCHMASTER displays inward and outward currents according to the physiological convention!

Correct configuration has to be selected by user!

**Recording Configurations (modes)**

- Select the accurate recording configuration in V-Clamp
- Switch to C-Clamp

**Test Pulse – Controls** (active only with Amplifier window in front)

**Offset – Controls**

- L J: enter value of Liquid-Liquid-Junction potential (in respect to bath)
- Auto: automatically adjusts all offsets, displays offset-value in [Vo] box

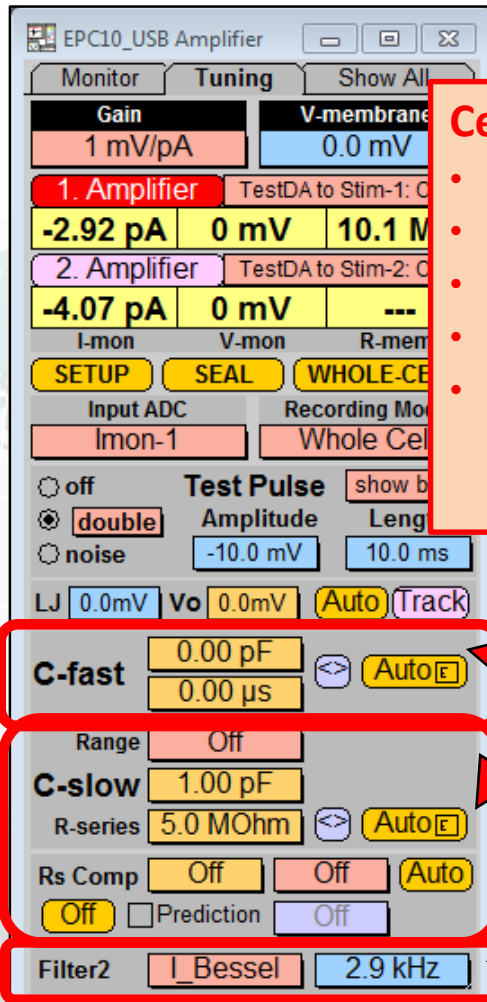


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## Cell capacitance (C-slow) & Serial Resistance (Rs) neutralization

- RANGE: select approximate max. cell size
- TOP BOX: displays cell capacitance (after pressing “Auto”)
- LOWER BOX: displays series resistance (Rs) (after pressing “Auto”)
- AUTO: automatically neutralizes cell capacitance & serial resistance
- Rs COMP (compensation):
  - Left box: shows % of compensation (after pressing “Auto”)
  - Right box: select speed of Rs-compensation

## C-fast – Pipette capacitance compensation

- TOP BOX: displays pipette capacitance (after pressing “Auto”)
- AUTO: automatically compensates pipette capacitance

## Filter2 – adjust filter setting for data output

- LEFT BOX: select low-pass analog filter (Bessel or Butterworth)
- RIGHT BOX: enter desired filter value (in Hz)



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EPC10\_USB Amplifier

Monitor Tuning Show All

Gain 1 mV/pA V-membrane 0.0 mV

1. Amplifier TestDA to Stim-1: OFF

-2.92 pA 0 mV 10.1 MO

2. Amplifier TestDA to Stim-2: OFF

-4.07 pA 0 mV ---

I-mon V-mon R-memb

SETUP SEAL WHOLE-CELL

Input ADC Recording Mode

lmon-1 Whole Cell

Test Pulse show both

double Amplitude Length

noise -10.0 mV 10.0 ms

LJ 0.0mV Vo 0.0mV Auto Track

C-fast 0.00 pF Auto

0.00 µs

Range Off

C-slow 1.00 pF Auto

R-series 5.0 MOhm Auto

Rs Comp Off Off Auto

Off Prediction Off

Filter2 I\_Bessel 2.9 kHz

## Main Menu – Windows - Parameters

Parameters

Marked Items Root Items Group Items Series Items Sweep Items Trace Items Amplifier Items

Amplifier State Titles LF

Flag Group 1 Flag Group 2 Flag Group 3 Flag Group 4

Copy Flags from Gr.1 Gr.2 Gr.3 Gr.4 Info to Notebook Gr.1

Default Flags Target to Notebook Target to File

Clear all Flags Marked to Notebook Marked to File

Low Freq VC LFVC Off

LFVC V-memb 0.000 V

CC-fast CC-fast

Auto C-fast success

Auto C-slow success

V-mon Scale 10x

Stim Scale 10x

Electrode Mode 2

Calibration Date 08-Feb-2016

Serial Number 590783-T

LockIn Phase 0.000 °

LockIn Attenuation 1.000

LockIn Mode Off

LockIn Calibration Measured

C-fast 5.923 pF

C-fast Tau 855.9 ns

C-fast Range Normal

C-slow Range CSlow100

C-slow 22.00 pF

R-series 5.013 MOhm

Rs-comp. 79.93 %

Rs-comp. Tau 100.0 µs

Leak Comp. 0.000 S

Liquid Junction 0.000 V

V-offset 195.2 µV

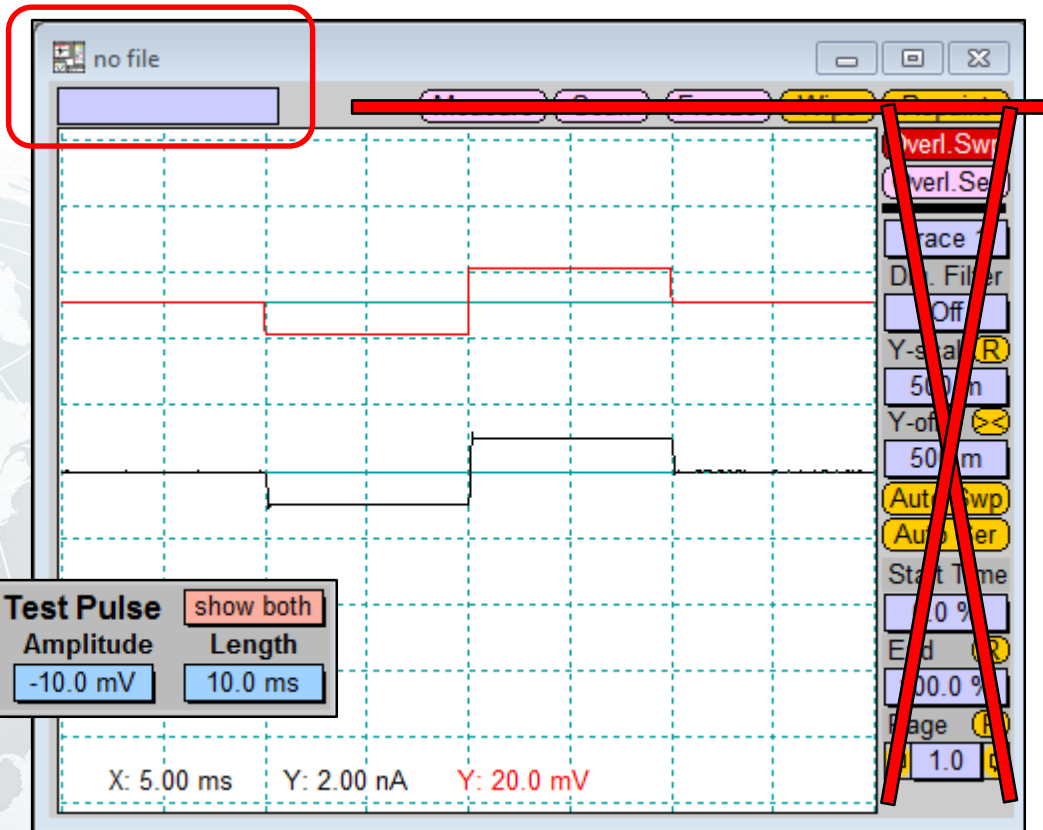
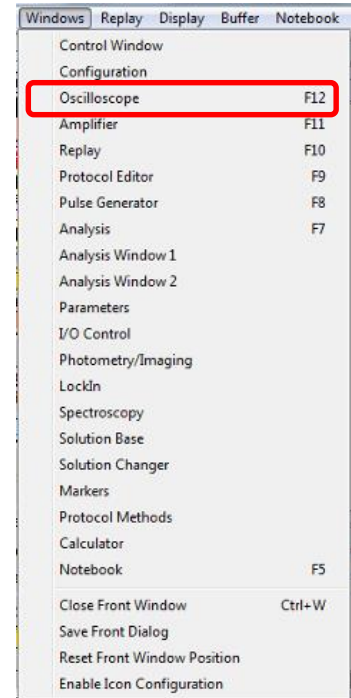
CC-gain 0.1pA/mV

- Respective parameters are updated by pressing “Auto”
- Parameter values at time of data recording are saved with data file



# PATCHMASTER – Oscilloscope Window

- ❑ Displays LIVE current response to:
  - Test Pulse
  - Stimulation sequences (from Pulse Generator)
- ❑ Displays data traces offline from Replay window

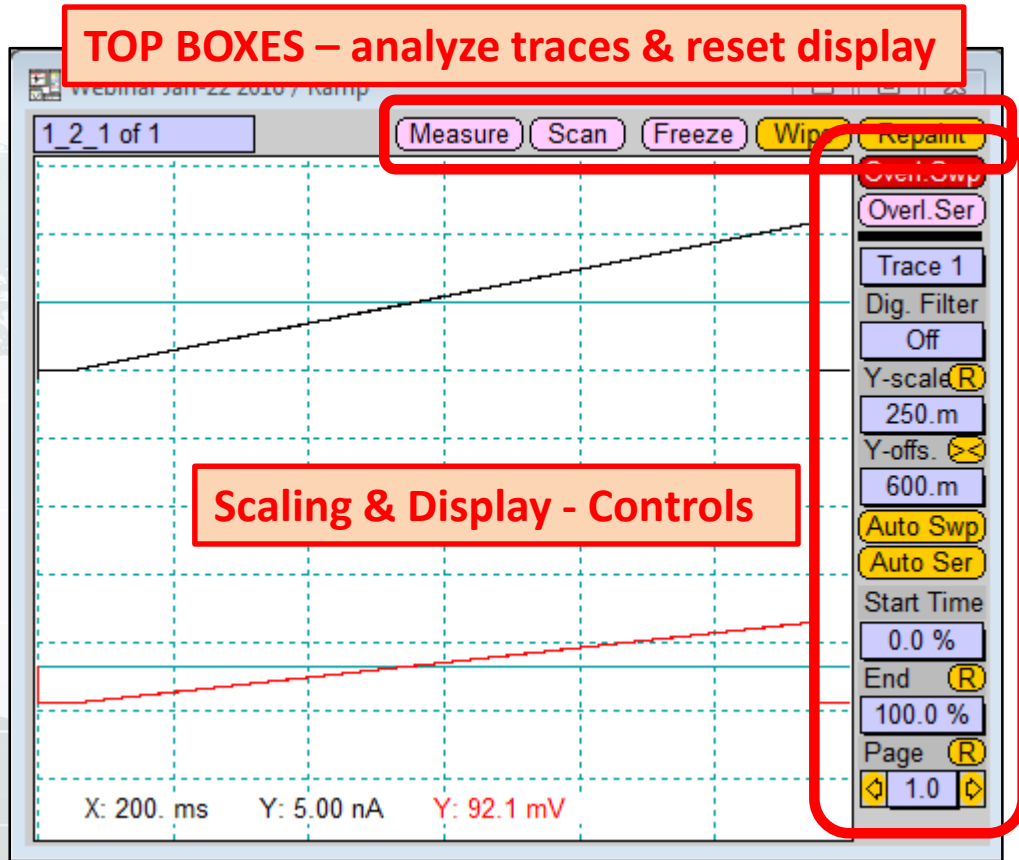




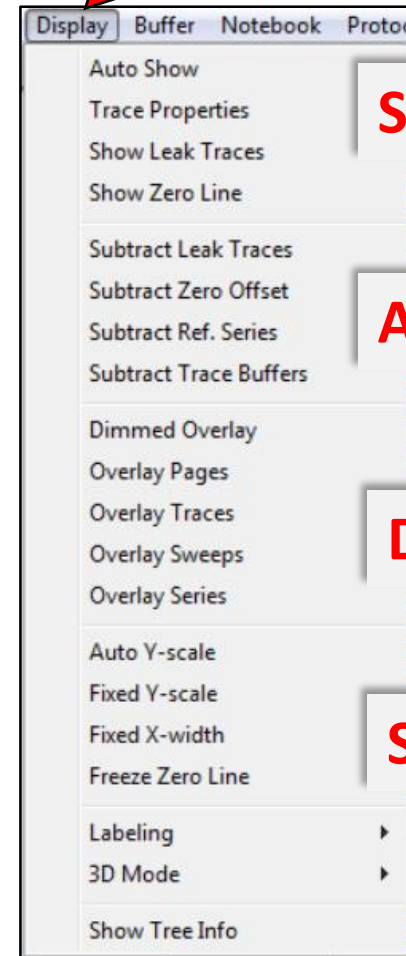
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- ❑ Displays LIVE current response to:
  - Test Pulse
  - Stimulation sequences (from Pulse Generator)
- ❑ Displays data traces offline from Replay window

Open data file (\*.dat) & Select a series (ramp)



Press “Display”  
in the Main Menu



**SPECIFY**

**ANALYSIS**

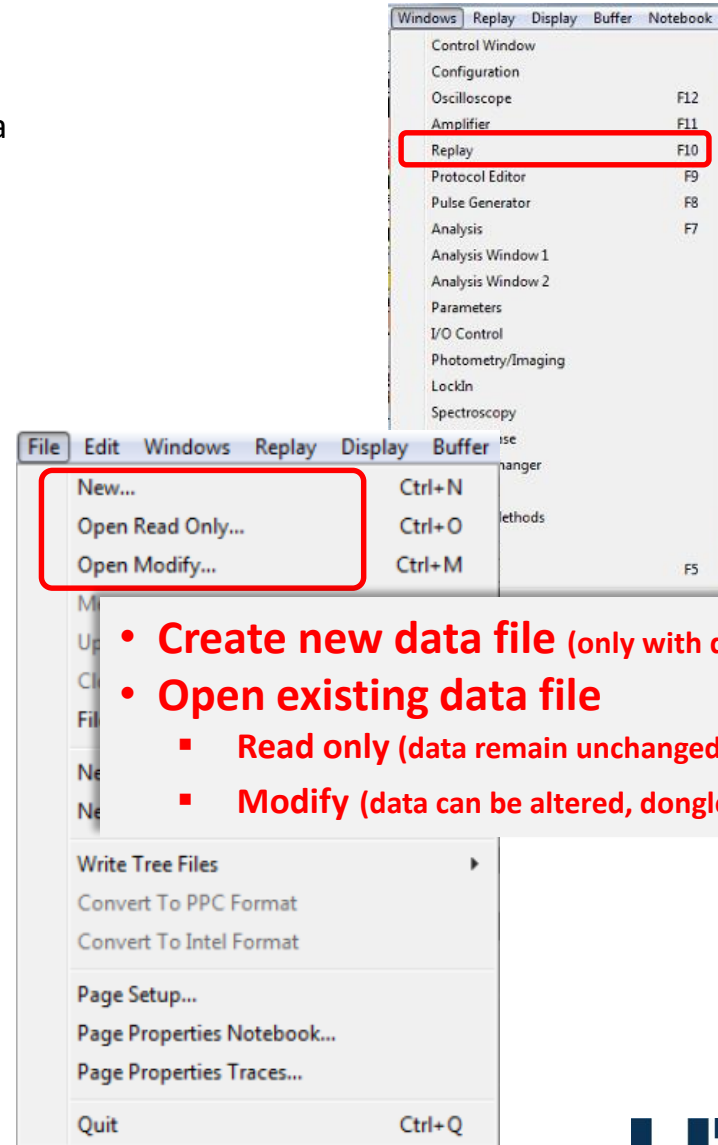
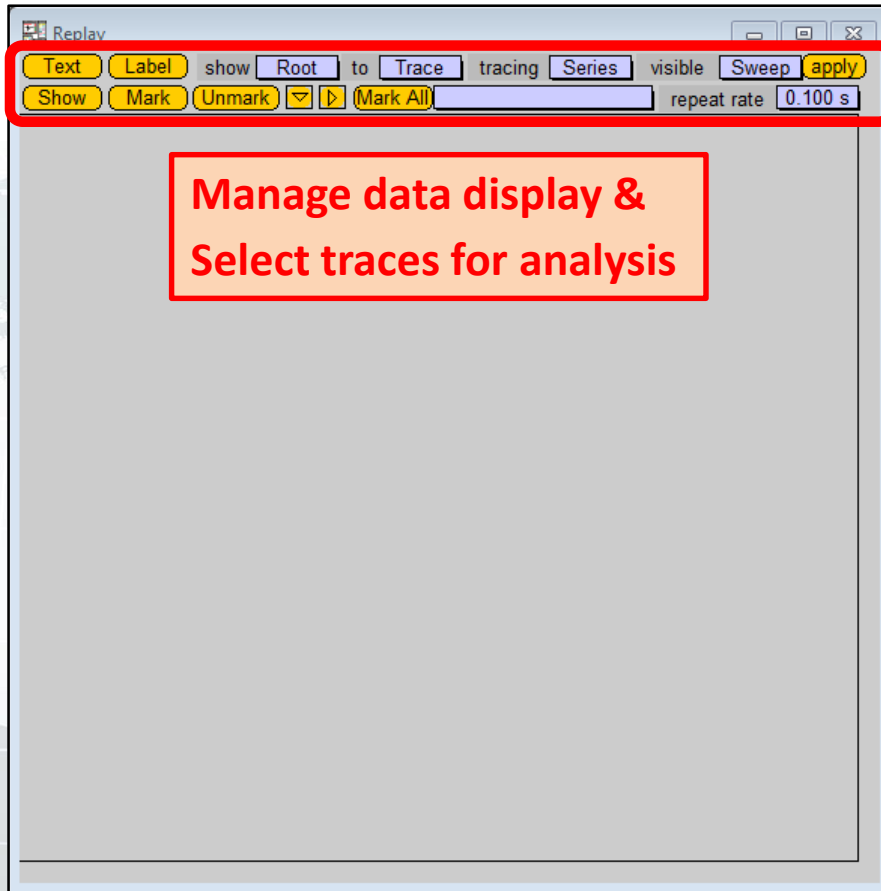
**DISPLAY**

**SCALING**



# PATCHMASTER – Replay Window

- ❑ Data can easily be accessed from here (5-level data tree)
- ❑ Information (text) about experiment can be linked to data
- ❑ Raw data + analyzed traces are stored together







# PATCHMASTER – Replay Window

- ❑ Data can easily be accessed from here (5-level data tree)
- ❑ Information (text) about experiment can be linked to data
- ❑ Raw data + analyzed traces are stored together

Open data file

add information

Root (Experiment)

Group (Cell)

Series (Stim. Seq.)

Sweeps

Traces

File Edit Windows Replay Display Buffer

- New... Ctrl+N
- Open Read Only... Ctrl+O
- New Group**
- New Experiment**
- Write Tree Files
- Convert To PPC Format
- Convert To Intel Format
- Page Setup...
- Page Properties Notebook...
- Page Properties Traces...
- Quit Ctrl+Q

- **Insert new branch** (only with dongle)
  - **New Group** (new cell or group of recordings)
  - **New Experiment** (new root or project)

## How to use the Replay window

- One dat-file (Root) per day (recommended)
- Create new “Group” for each cell/project
- Add specific experiment related information to “Root” or “Group”



# PATCHMASTER – Pulse Generator Window

- ❑ Creating stimulus sequences (IV-curves, ramps, continuous recordings, etc.)
- ❑ Pool of stimulus sequences can be saved in one \*.pgf file
- ❑ Provides link to online Analysis

Pool of Stimulus Sequences

The screenshot shows the Pulse Generator window with the following settings:

- Timing:** No wait before 1. Sweep (checked), Not Triggered (checked), No of Sweeps: 10, Sweep Interval: 0.00 s, Sample Interval: 10.0  $\mu$ s (100.kHz), Use Durations (checked), StartSeg: 0, StartTime: 0.00.
- Checking:** EXECUTE button.
- Sweep Length:** Total: 70.00 ms, 7000 pts; Stored: 70.00 ms, 28000 bytes; Channel Length: Stimulus: 70.00 ms, 7000 pts.
- Segments:** 1 Stored Constant, 2 Stored Constant, 3 Stored Constant, 4 Not Store Constant, 5, 6. Parameters include holdV-memb, Duration, V-incr. Mode, V-fact./incr. [mV], t-incr. Mode, t-fact./incr. [ms].
- Common Timing:** Voltage Clamp, Filter Factor, Analysis: Edit.
- Rel X-seg:** 2, **Rel Y-seg:** 2.
- Leak Pulses:** No of Leaks: 0, Leak Delay: -100  $\mu$ s, Leak Size: 0.100, Leak Hold [mV]: ---.
- Waveform Plot:** Shows a series of pulses with a 10.0mV vertical scale and 5.00ms horizontal scale.
- Traces:** 2

Sweeps & Acquisition Frequency

The Windows menu is open, showing the following items:

- Control Window
- Configuration
- Oscilloscope F12
- Amplifier F11
- Replay F10
- Protocol Editor F9
- Pulse Generator F8** (highlighted)
- Analysis F7
- Analysis Window 1
- Analysis Window 2
- Parameters
- I/O Control
- Photometry/Imaging
- LockIn
- Spectroscopy
- Solution Base
- Solution Changer
- Markers
- Protocol Methods
- Calculator
- Notebook F5
- Close Front Window Ctrl+W
- Save Front Dialog
- Reset Front Window Position
- Enable Icon Configuration



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Check "STORE" box, otherwise data trace will NOT be saved !

Stimulation & Recording channels

Link to online Analysis

- Enter exact name of analysis method
- Specify relevant segments in stimulus sequence

Shape & Size of Stimulation Sequence



# PATCHMASTER – Analysis Windows

- ❑ Online (live) analysis from recorded data trace & display in separate Analysis window
- ❑ Vast amount (98) of analysis functions (timing, stimulation properties, measurements, LockIn, AP analysis, trace & sweep parameters, math, power specs, etc.)
- ❑ Offline analysis & display

## On/Off & Select Switch

- Chose if and how Analysis Methods are processed

Analysis: DefAnal

Auto Stim Control: Pool

**Analysis Methods: Analysis Pool**

1 IV 2 Chart 3 Ramp 4 Continuous

Load Merge Save IV New Delete Move

**Analysis Functions**

1 Ampl\_1

Function Type: Ampl

Name: An

**Input**

Y-Trace: Trace 1

**Cursors**

X-, Y-seg. Offset: 0 0

Cursor Bounds (%): 0.0 100.0

**Analysis Graphs**

Graph 1 On Graph 2 On Graph 3 Off

Save to Tree Copy Print Redraw

**Scale Axis**  Overlay  No Wrap

	Min	Max	Scale		1	2	3	4
X	-60.0m	30.0m	Auto Swp.	X	Ampl_1	Ampl_1	Ampl_1	Ampl_1
Y	-120.p	60.2p	Auto Swp.	Y	Mean	Ampl_1	Ampl_1	Ampl_1

Modify Axis  Share X-axis

**Graph Positions**

	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
Graph in Window 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graph in Window 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Create new Analysis Method or Select existing method to be edited

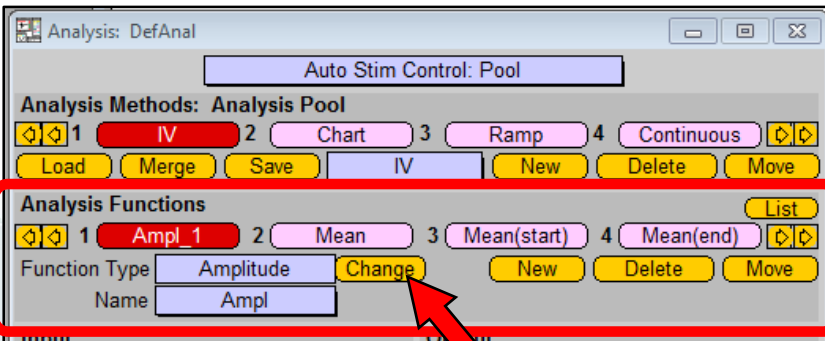
Windows | Replay | Display | Buffer | Notebook

- Control Window
- Configuration
- Oscilloscope F12
- Amplifier F11
- Replay F10
- Protocol Editor F9
- Pulse Generator F8
- Analysis F7
- Analysis Window 1
- Analysis Window 2
- Parameters **Display only**
- I/O Control
- Photometry/Imaging
- LockIn
- Spectroscopy
- Solution Base
- Solution Changer
- Markers
- Protocol Methods
- Calculator
- Notebook F5
- Close Front Window Ctrl+W
- Save Front Dialog
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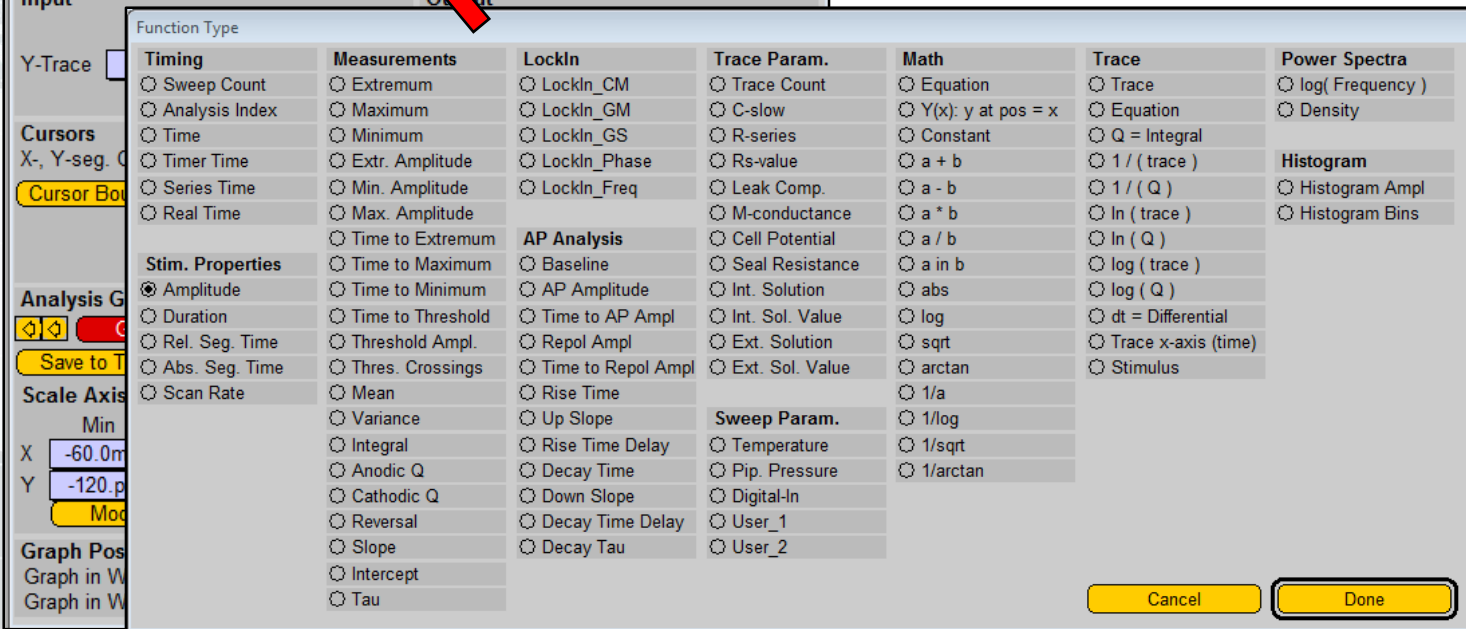


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Define Analysis Functions for selected method





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- ❑ Vast amount (98) of analysis functions (timing, stimulation properties, measurements, LockIn, AP analysis, trace & sweep parameters, math, power specs, etc.)
- ❑ Offline analysis & display

The screenshot shows the 'Analysis: DefAnal' window. At the top, there's a button for 'Auto Stim Control: Pool'. Below that, the 'Analysis Methods' section includes a list of methods: 1 IV, 2 Chart, 3 Ramp, 4 Continuous. There are buttons for 'Load', 'Merge', 'Save', 'New', 'Delete', and 'Move'. The 'Analysis Functions' section lists: 1 Ampl\_1, 2 Mean, 3 Mean(start), 4 Mean(end). It also has buttons for 'List', 'Change', 'New', 'Delete', and 'Move'. The 'Function Type' is set to 'Amplitude' and the 'Name' is 'Ampl'. Below this, there are two main sections: 'Input' and 'Output'. The 'Input' section has 'Y-Trace' set to 'Trace 1' and 'Cursors' with 'X-, Y-seg. Offset' at 0 and 'Cursor Bounds (%)' at 0.0 and 100.0. The 'Output' section has 'Notebook' checked and 'Not Stored in Values'. The 'Analysis Graphs' section shows 'Graph 1' is 'On', 'Graph 2' is 'On', and 'Graph 3' is 'Off'. There are buttons for 'Save to Tree', 'Copy', 'Print', and 'Redraw'. The 'Scale Axis' section has 'Overlay' unchecked and 'No Wrap' selected. The 'Graph Entries' section shows a table with columns for X and Y axes and rows for entries 1, 2, 3, and 4. Entry 1 is checked. The 'Graph Positions' section shows a grid for 'Graph in Window 1' and 'Graph in Window 2'.

**Modify selected Analysis Function**  
• Available options depend on function type

**Specify Display (Graph) Parameters**



# PATCHMASTER – Protocol Editor

- ❑ Allows user to fully automate entire experiment (amplifier, acquisition and analysis)
- ❑ Saving settings allows user to replicate experimental conditions precisely
- ❑ Exchange of protocol files between colleagues

**Pool of Protocol Files**

1: Command: "E Reset"  
2: Command: "E Mode 3; Whole Cell"  
3: Command: "E CSlow 0; 0 pF"  
4: Command: "E RSeries 0; 0 M-ohm"  
5: Command: "E PulseMode 1, single pulse"  
6: Command: "E PulseTrace 0; current"  
7: Command: "E PulseAmp -5.0mV"  
8: Command: "E PulseDur 10.0ms"  
9: Command: "E Gain 9; 2.0 mV/pA"  
10: Command: "E AutoZero"  
11: Command: "E SaveRpip"

**Enter & Modify Commands**

Windows	Replay	Display	Buffer	Notebook
Control Window				
Configuration				
Oscilloscope				F12
Amplifier				F11
Replay				F10
Protocol Editor				F9
Pulse Generator				F8
Analysis				F7
Analysis Window 1				
Analysis Window 2				
Parameters				
I/O Control				
Photometry/Imaging				
LockIn				
Spectroscopy				
Solution Base				
Solution Changer				
Markers				
Protocol Methods				
Calculator				
Notebook				F5
Close Front Window				Ctrl+W
Save Front Dialog				
Reset Front Window Position				
Enable Icon Configuration				



# PATCHMASTER – Protocol Editor

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## List of Events

Protocol Editor: Demo

1 SETUP 2 SEAL 3 WHOLE-CEL 4 5 6

1: Command: "E Reset"  
2: Command: "E Mode 3; Whole Cell"  
3: Command: "E CSlow 0; 0 pF"  
4: Command: "E RSeries 0; 0 M-ohm"  
5: Command: "E PulseMode 1, single pulse"  
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8: Command: "E PulseDur 10.0ms"  
9: Command: "E Gain 9; 2.0 mV/pA"  
10: Command: "E AutoZero"  
11: Command: "E SaveRpip"

LOAD SAVE SETUP NEW  
STEP TO END Write LIST  
Record Macros Relative Value non-  
Events 1 of 11 Insert Before Inse  
Duplicate Delete  
Macro Command  Skip Delay  
Command E Reset  
Repeat Status  
IF etc. Result

Protocol Sequence  
Break  
Chain Protocol  
Clear Key  
Goto  
Goto\_Mark  
IF...Then  
Elseif...Then  
Else  
Launch  
Macro Command  
Repeat  
Switch Window  
Wait  
Acquisition  
Acquire Each Sweep  
Acquire Properties  
Acquire Series  
Set Sweep Label  
Test Pulse  
Hardware  
Amplifier  
Serial Output  
Set DAC  
Set Digital Bit  
Set Digital Word  
Set Solution Changer  
Data/Display

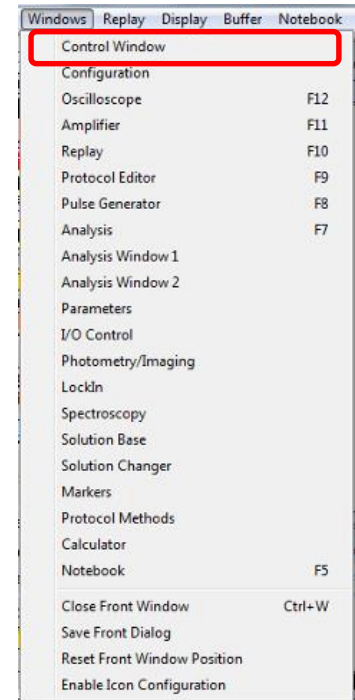
Data/Display  
Analysis  
Digital Filters  
Display Properties  
Export  
File Operation  
Replay  
Trace Buffer  
Value/Parameter  
PGF Parameters  
Set Solutions  
Set Value  
Messages  
Annotation  
Beep  
Write Icon Value  
Extensions  
LockIn  
ElProScan  
Photometry  
E-Chem Methods  
Cyclic Voltammetry  
Impedance Spectroscopy  
Open Circuit Potential  
Square Wave Voltammetry





# PATCHMASTER – Control window

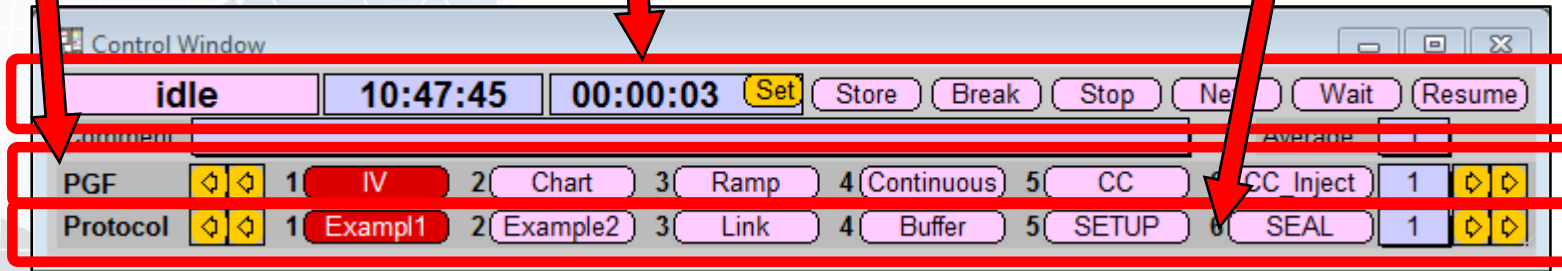
- ❑ Provides controls to steer the experimental procedure
- ❑ Offers information on status of current experiment
- ❑ Easy access to 1-click activation of all stimulus sequences and protocol scripts



Status Information & Control Buttons

Stimulus sequences  
(1-click access)

Protocol scripts  
(1-click access)



\* For detailed information, please download  
"PATCHMASTER manual" from HEKA website \*

# PATCHMASTER – Record, Display, Save and Analyze Data

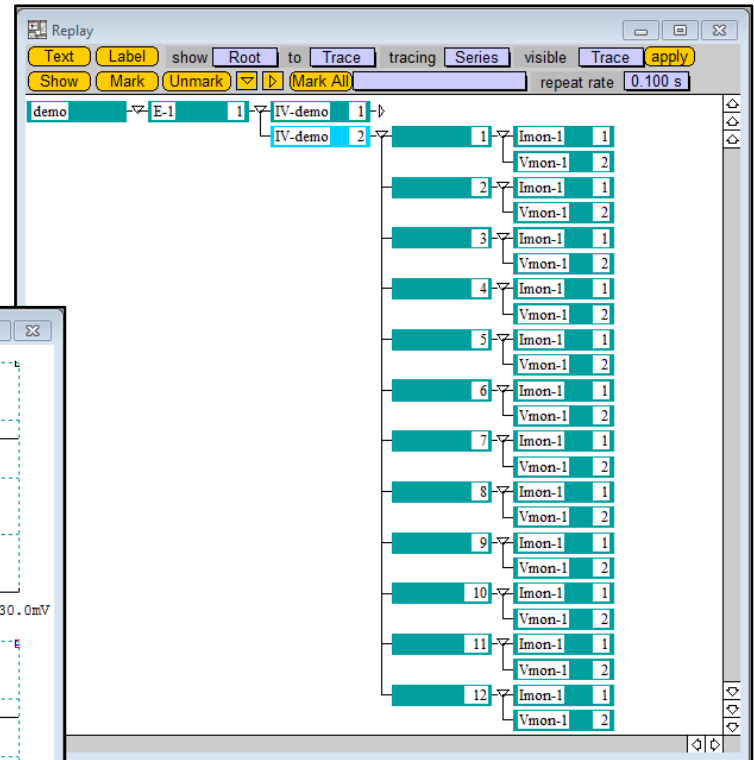
## ❑ 1-click:

- Records data (Control window starts stimulation sequence or protocol script)
- Displays live data traces (Oscilloscope)
- Saves (store) data (Replay window displays data tree)
- Analyzes data while doing all of the above (Pulse Generator links to online Analysis)

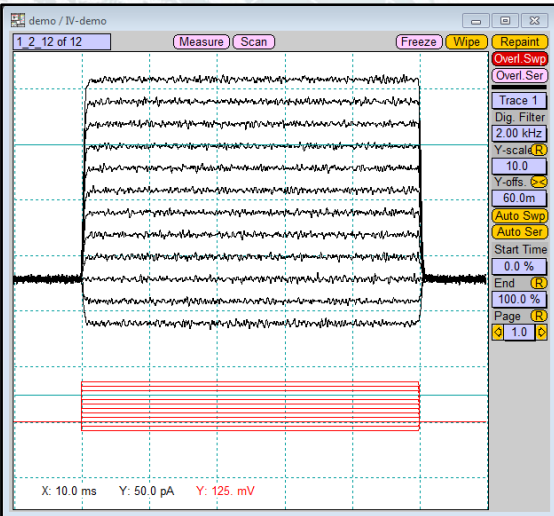
## RECORD



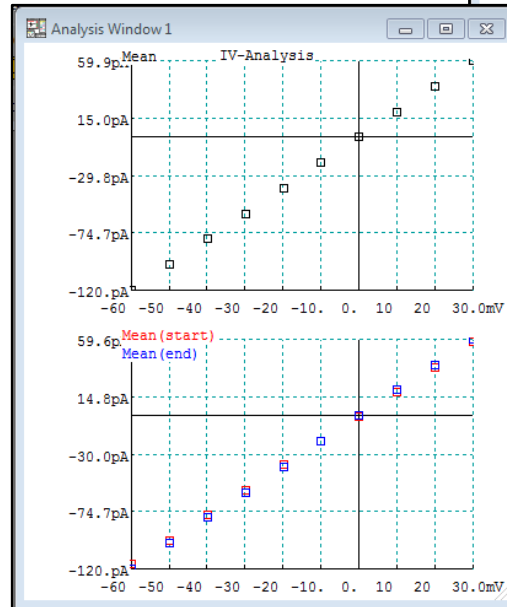
## STORE



## DISPLAY



## ANALYSIS



# Overview of the following LIVE Demonstration

## Maintenance

- Save changes in “PatchMaster.set” file
- Hide “PatchMaster.set” file, restart “Defaults” & Hardware selection
- Customize colors & fonts of windows

## Establish Whole-Cell configuration (model cell)

- Use manual control
- Use Auto buttons (modifiable with Protocol Editor)

## Record Data & online Analysis

- Create stimulus sequence using Pulse Generator
- Start experiment by using Control window
- Adjust Oscilloscope display scaling
- Enable Analysis & display in window

## Export Data traces

- Use copy & paste
- Other export options

