



# TecellaLab

## User Guide

### Tecella

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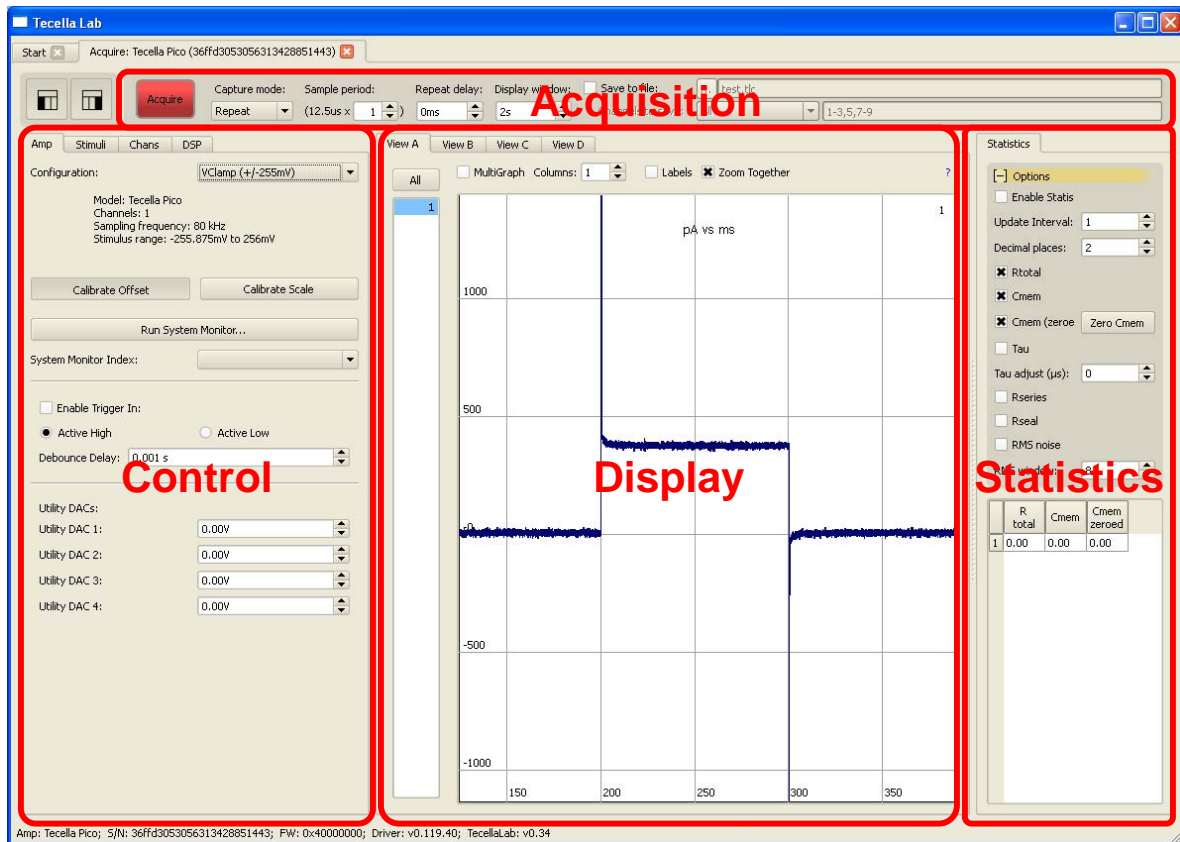
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# 1. Main Window

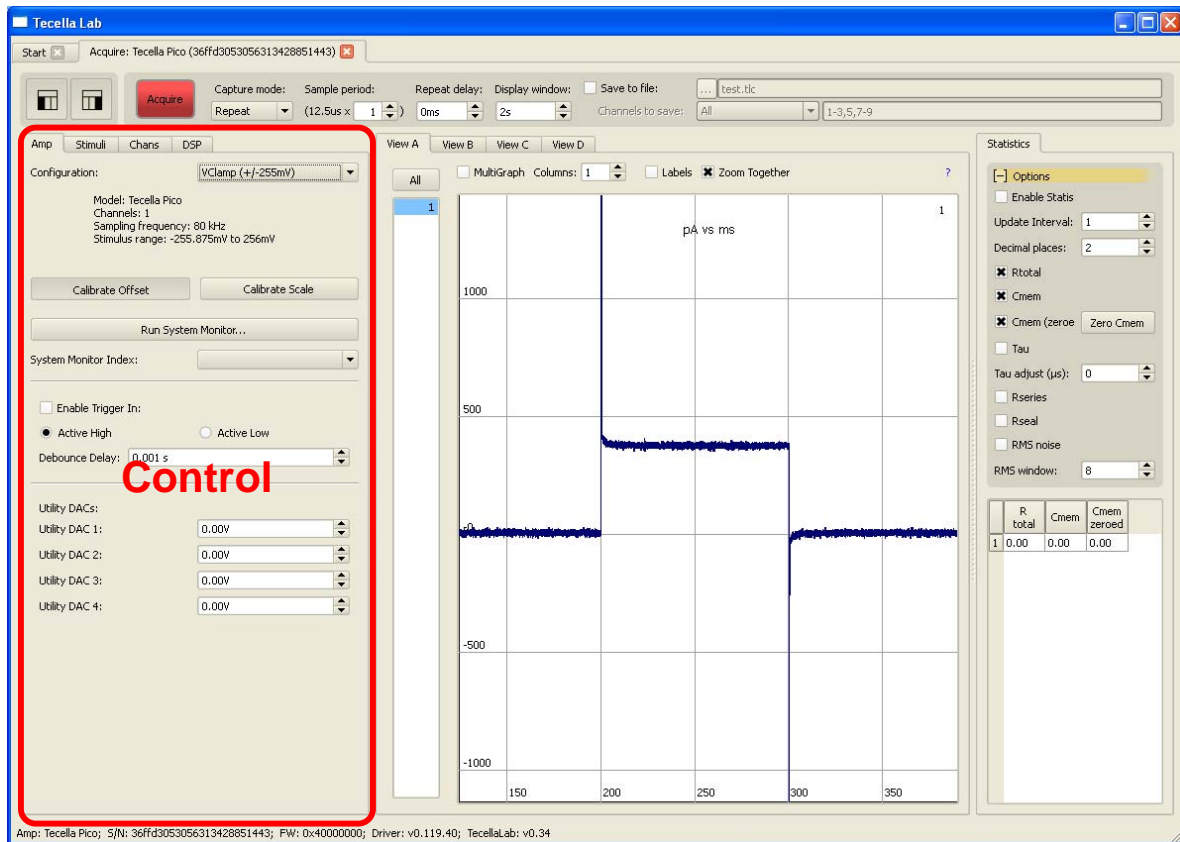


TecellaLab's Main Window is comprised of 4 sections:

- Acquisition
- Control
- Display
- Statistics

Each of these sections are explained in further detail in the following pages.

## 2. Control



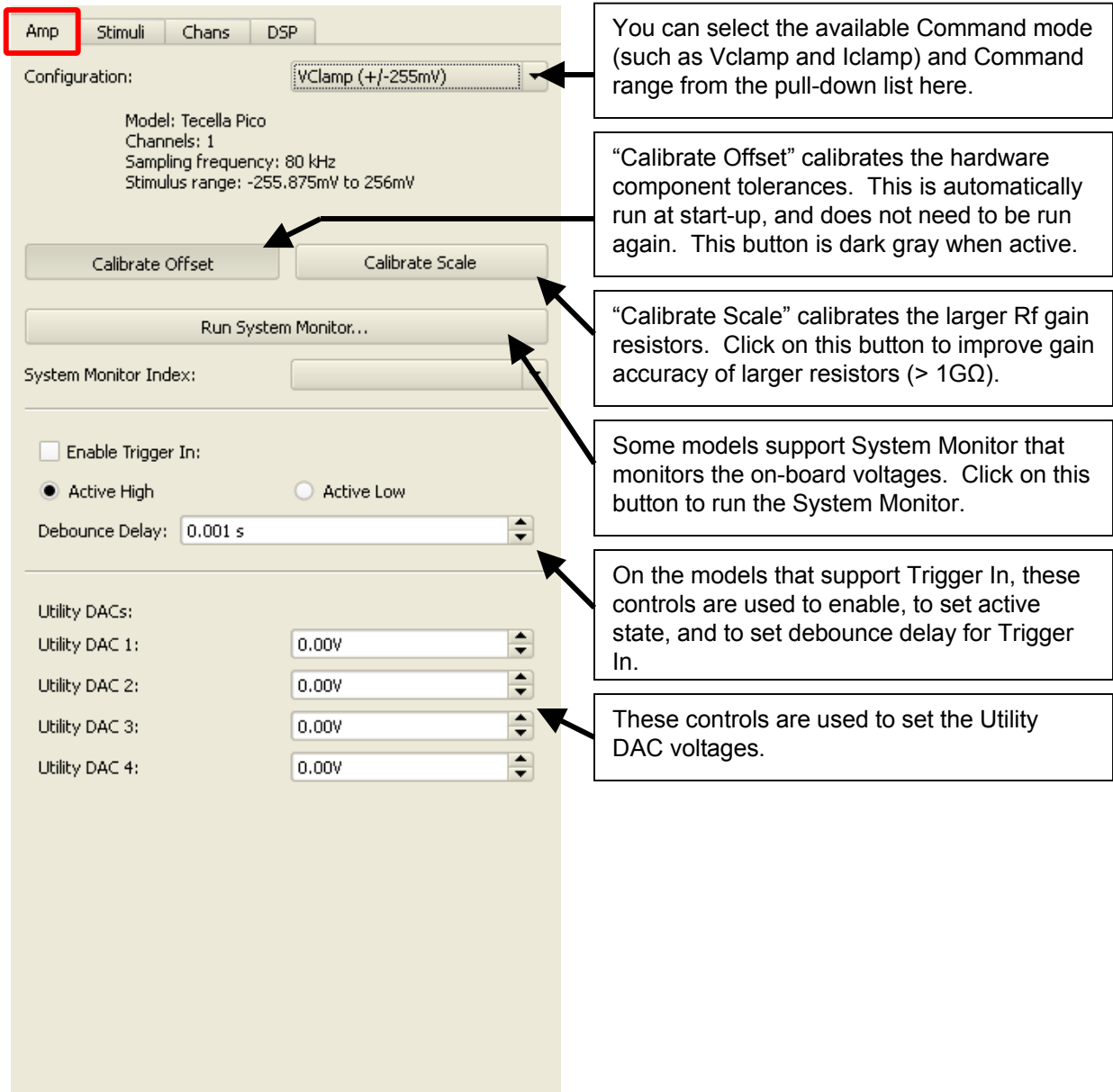
The Control section contains all the functions for controlling the amplifier and stimuli, as well as the DSP functions. The Control section is comprised of the following 4 tabs.

- Amplifier
- Stimuli
- Channels
- DSP

Each of these tabs are explained in further detail in the following pages.

## 2-1. Amplifier tab

The Amplifier tab contains the controls for your amplifier's hardware. You should not need to change settings on this tab often.



The screenshot shows the 'Amp' tab in the TecellaLab software. The 'Configuration' section is set to 'VClamp (+/-255mV)'. Below this, the model is 'Tecella Pico' with 1 channel and a sampling frequency of 80 kHz. The stimulus range is from -255.875mV to 256mV. There are two buttons: 'Calibrate Offset' (dark gray) and 'Calibrate Scale'. A 'Run System Monitor...' button is also present. The 'System Monitor Index' is set to 1. Under 'Enable Trigger In', 'Active High' is selected with a 0.001 s debounce delay. At the bottom, four 'Utility DACs' are all set to 0.00V.

**Amp** Stimuli Chans DSP

Configuration: VClamp (+/-255mV)

Model: Tecella Pico  
Channels: 1  
Sampling frequency: 80 kHz  
Stimulus range: -255.875mV to 256mV

Calibrate Offset Calibrate Scale

Run System Monitor...

System Monitor Index: 1

Enable Trigger In:  
 Active High  Active Low  
 Debounce Delay: 0.001 s

Utility DACs:  
 Utility DAC 1: 0.00V  
 Utility DAC 2: 0.00V  
 Utility DAC 3: 0.00V  
 Utility DAC 4: 0.00V

You can select the available Command mode (such as Vclamp and Iclamp) and Command range from the pull-down list here.

“Calibrate Offset” calibrates the hardware component tolerances. This is automatically run at start-up, and does not need to be run again. This button is dark gray when active.

“Calibrate Scale” calibrates the larger Rf gain resistors. Click on this button to improve gain accuracy of larger resistors (> 1GΩ).

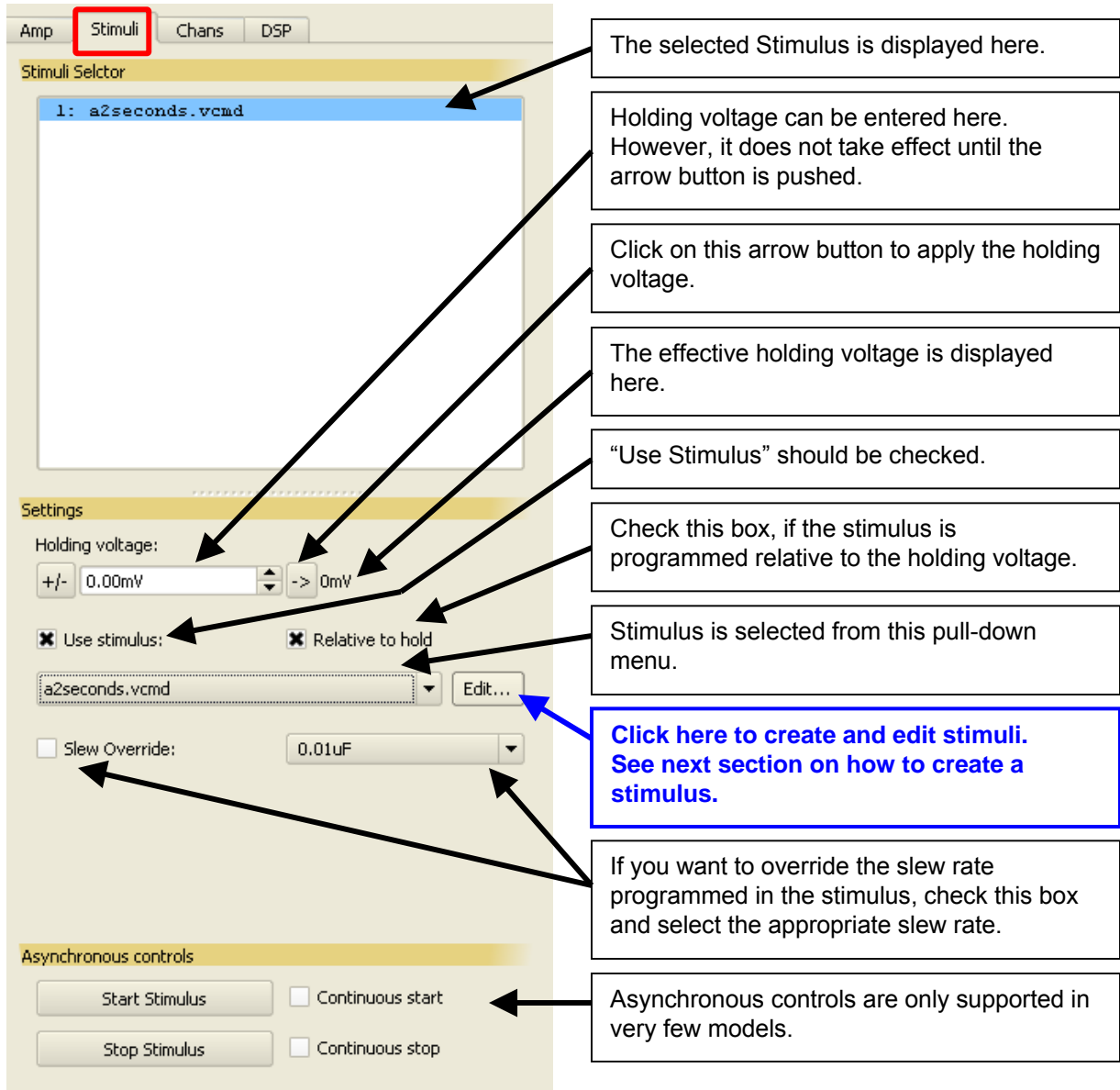
Some models support System Monitor that monitors the on-board voltages. Click on this button to run the System Monitor.

On the models that support Trigger In, these controls are used to enable, to set active state, and to set debounce delay for Trigger In.

These controls are used to set the Utility DAC voltages.

## 2-2. Stimuli tab

The Stimuli tab contains the controls for creating, editing, selecting, and managing your stimuli.

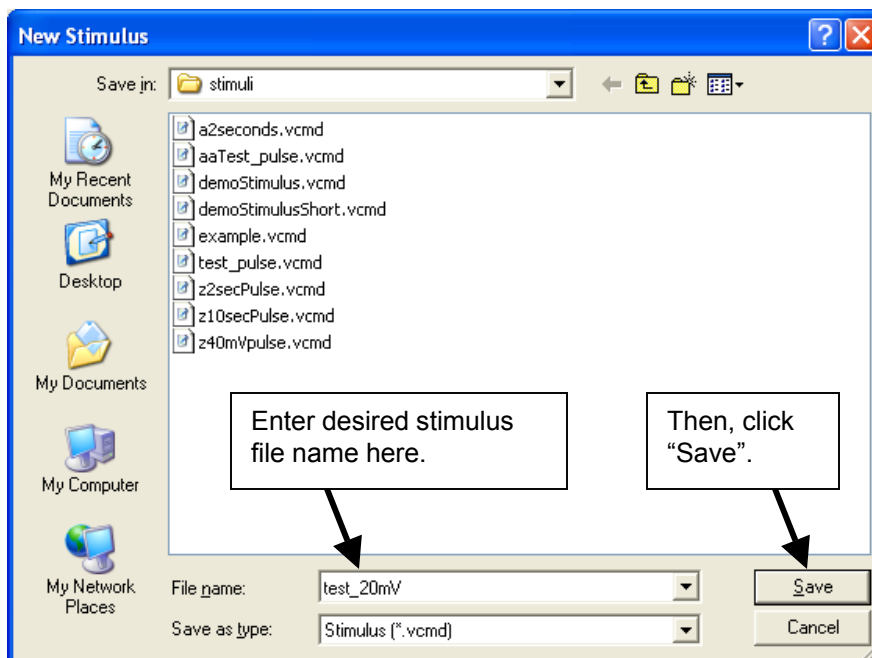
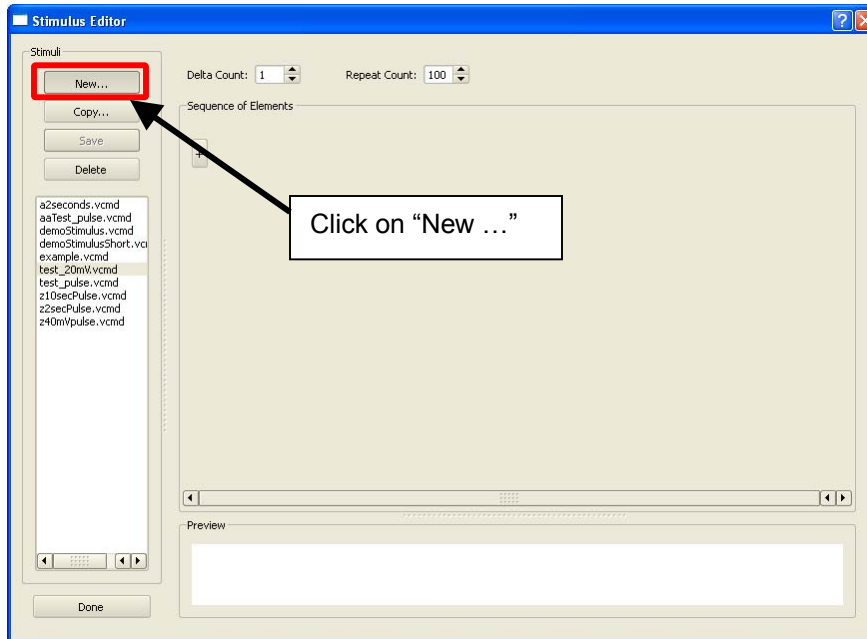


The screenshot shows the Stimuli tab interface with the following callout boxes:

- The selected Stimulus is displayed here.** (Points to the Stimuli Selector list)
- Holding voltage can be entered here. However, it does not take effect until the arrow button is pushed.** (Points to the Holding voltage input field)
- Click on this arrow button to apply the holding voltage.** (Points to the right arrow button)
- The effective holding voltage is displayed here.** (Points to the 0mV output field)
- “Use Stimulus” should be checked.** (Points to the Use stimulus checkbox)
- Check this box, if the stimulus is programmed relative to the holding voltage.** (Points to the Relative to hold checkbox)
- Stimulus is selected from this pull-down menu.** (Points to the stimulus name dropdown)
- Click here to create and edit stimuli. See next section on how to create a stimulus.** (Points to the Edit... button)
- If you want to override the slew rate programmed in the stimulus, check this box and select the appropriate slew rate.** (Points to the Slew Override checkbox and dropdown)
- Asynchronous controls are only supported in very few models.** (Points to the Start/Stop Stimulus buttons)

## 2-2-1. Create a New stimulus

When you click the “Edit ...” button from the previous page, you will see the following Stimulus Editor window.



## 2-2-2. Create a New stimulus or Edit an existing stimulus

The screenshot shows the Stimulus Editor window with the following callout boxes:

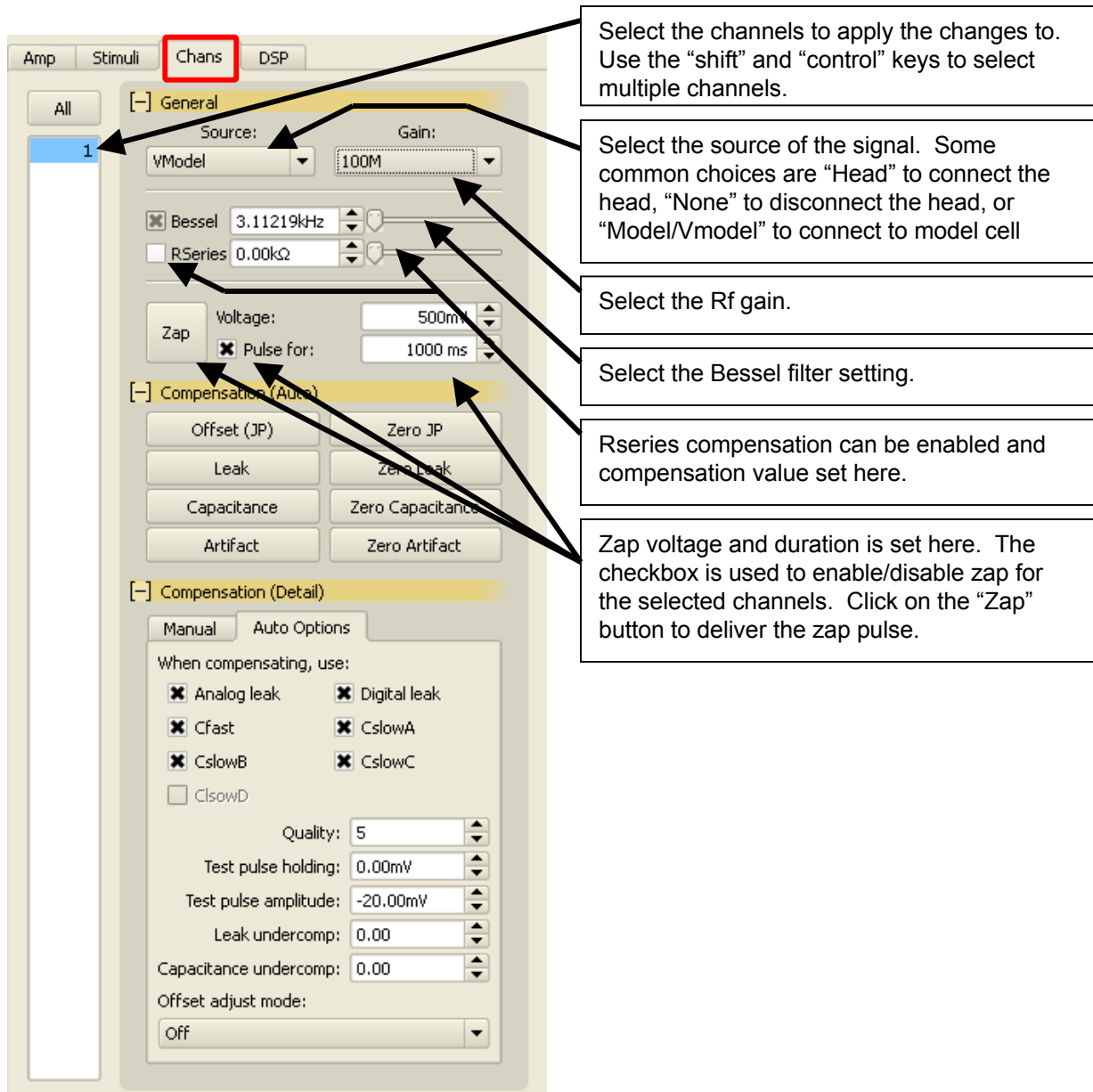
- Set Delta count here. Usually leave this as 1.** (points to Delta Count: 1)
- Enter Repeat count here.** (points to Repeat Count: 100)
- Click to delete segment.** (points to the minus sign between segments 2 and 3)
- Click to add segment.** (points to the plus sign between segments 4 and 5)
- Select segment type here.** (points to the dropdown menu for segment 5)
- Digital Out control.** (points to the Digital Outs grid for segment 5)
- Slew control for segment.** (points to the Slew Rate dropdown for segment 5)
- Voltage for segment.** (points to the Amplitude (mV) dropdown for segment 5)
- Duration for segment.** (points to the Duration (ms) dropdown for segment 5)
- Click "Save", then "Done" when finished.** (points to the Save and Done buttons)
- Preview the stimulus here.** (points to the Preview waveform plot)

The Stimulus Editor interface includes a "Stimuli" list on the left, a "Sequence of Elements" table with columns for Digital Outs, Slew Rate, Amplitude (mV), and Duration (ms), and a "Preview" section at the bottom showing a square wave stimulus.



## 2-3. Channels tab (part 1 of 2)

The Channels tab contains the controls for controlling modes and compensations for each channel.



The screenshot shows the 'Channels' tab in the Tecella software interface. The interface is divided into several sections: 'General', 'Compensation (Auto)', and 'Compensation (Detail)'. The 'General' section includes controls for 'Source' (set to 'VModel'), 'Gain' (set to '100M'), 'Bessel' filter (set to '3.11219kHz'), and 'RSeries' (set to '0.00kΩ'). The 'Zap' section includes 'Voltage' (set to '500mV') and 'Pulse for:' (set to '1000 ms'). The 'Compensation (Auto)' section includes buttons for 'Offset (JP)', 'Leak', 'Capacitance', 'Artifact', 'Zero JP', 'Zero Leak', 'Zero Capacitance', and 'Zero Artifact'. The 'Compensation (Detail)' section includes 'Manual' and 'Auto Options' tabs, and a list of checkboxes for 'Analog leak', 'Digital leak', 'Cfast', 'CslowA', 'CslowB', 'CslowC', and 'CslowD'. The 'Quality' is set to '5', 'Test pulse holding' is '0.00mV', 'Test pulse amplitude' is '-20.00mV', 'Leak undercomp' is '0.00', and 'Capacitance undercomp' is '0.00'. The 'Offset adjust mode' is set to 'Off'. A red box highlights the 'Chans' tab, and a blue box highlights the channel list on the left. Arrows point from callout boxes to various controls.

Select the channels to apply the changes to. Use the "shift" and "control" keys to select multiple channels.

Select the source of the signal. Some common choices are "Head" to connect the head, "None" to disconnect the head, or "Model/Vmodel" to connect to model cell

Select the Rf gain.

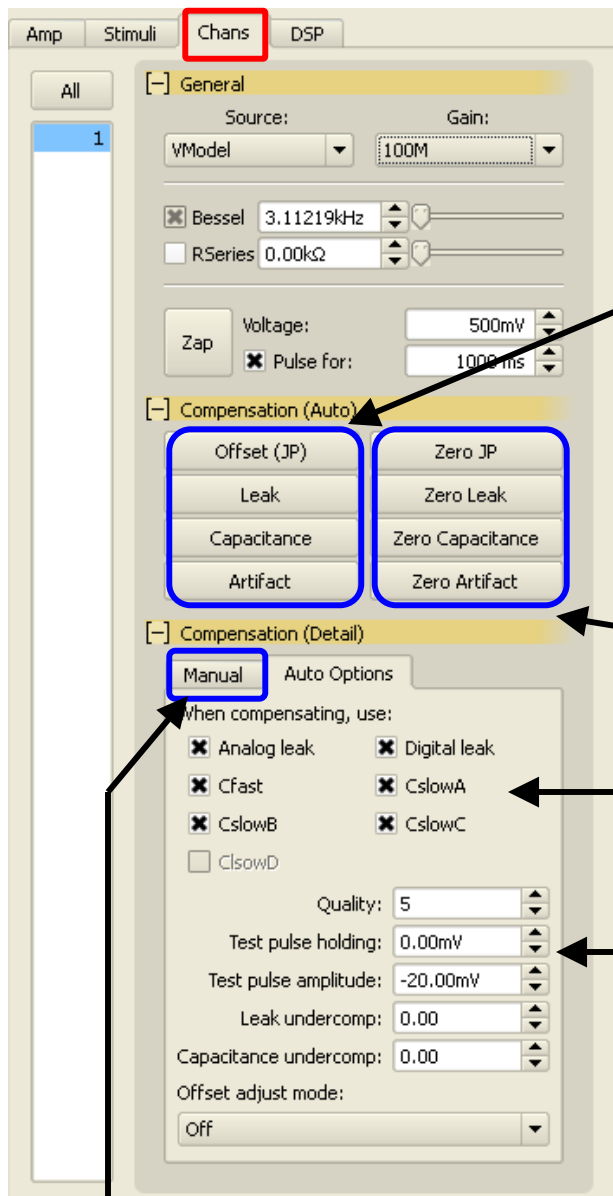
Select the Bessel filter setting.

Rseries compensation can be enabled and compensation value set here.

Zap voltage and duration is set here. The checkbox is used to enable/disable zap for the selected channels. Click on the "Zap" button to deliver the zap pulse.

## 2-3. Channels tab (part 2 of 2)

The Channels tab contains the controls for controlling modes and compensations for each channel.



The screenshot shows the 'Chans' tab in the software interface. The 'General' section includes 'Source' (VModel) and 'Gain' (100M). The 'Compensation (Auto)' section has buttons for Offset (JP), Zero JP, Leak, Zero Leak, Capacitance, Zero Capacitance, and Artifact, Zero Artifact. The 'Compensation (Detail)' section has a 'Manual' button and 'Auto Options' with checkboxes for Analog leak, Digital leak, Cfast, CslowA, CslowB, CslowC, and CslowD. Below these are sliders for Quality, Test pulse holding, Test pulse amplitude, Leak undercomp, and Capacitance undercomp, and a dropdown for Offset adjust mode.

After setting the Compensation Detail below, click on these buttons to perform Auto Compensation.

“Offset (JP)” to compensate offset at the head.  
 “Leak” to compensate leak from seal.  
 “Capacitance” to compensate total capacitance.  
 “Artifact” to digitally remove all artifacts.

These buttons are used to set the zero point for each of the compensations. Usually, these buttons do not need to be pressed.

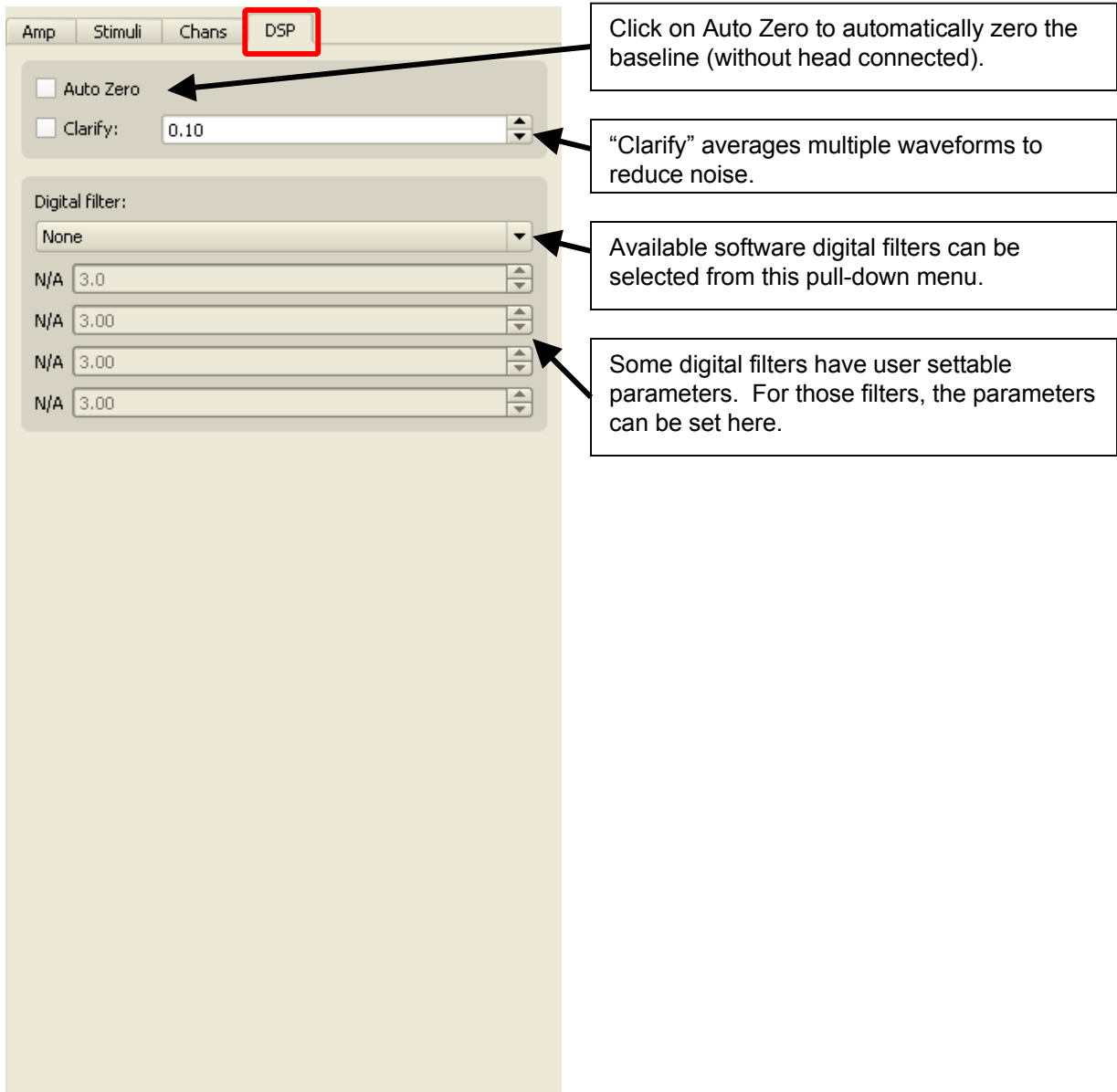
Select the parameters to include in Auto Compensation.

Set the test pulse to be used for Auto Compensation.

All of the compensation can be performed manually by clicking on this tab.

## 2-4. DSP tab

The DSP tab contains the controls for TecellaLab's soft-DSP features.



The screenshot shows the DSP tab interface with the following callouts:

- Auto Zero:** Click on Auto Zero to automatically zero the baseline (without head connected).
- Clarify:** "Clarify" averages multiple waveforms to reduce noise.
- Digital filter:** Available software digital filters can be selected from this pull-down menu.
- Parameters:** Some digital filters have user settable parameters. For those filters, the parameters can be set here.

### 3. Acquisition section

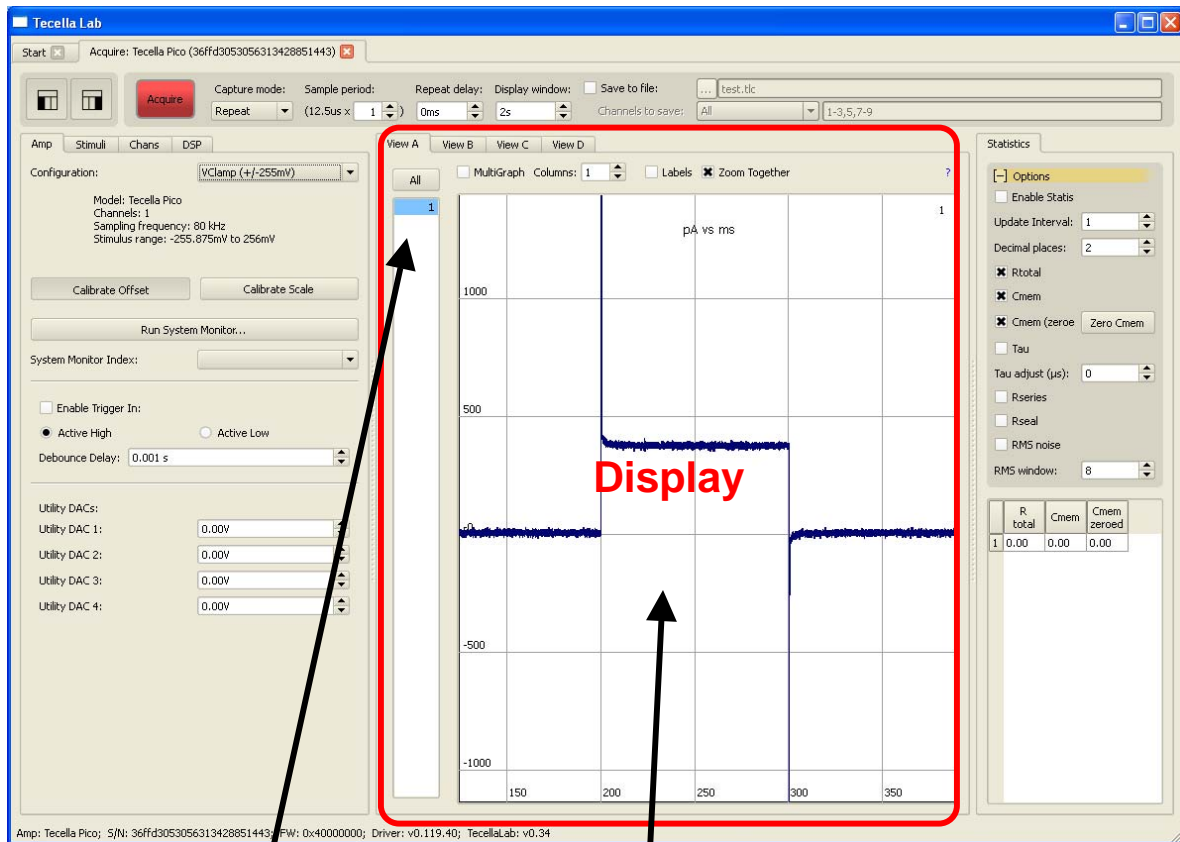
The screenshot shows the Tecella Lab software interface. A red box highlights the acquisition control bar at the top. Callout boxes provide instructions for various settings:

- Acquire button:** Click on this button to start and stop acquisition.
- Capture mode:** Set the acquisition mode here. Choices are "Repeat", "Continuous", and "Single".
- Sample period:** Sampling rate can be reduced here.
- Repeat delay:** For REPEAT mode, set the time between repeats here.
- Display window:** For CONTINUOUS mode, set the window size here.
- Save to file:** Save to file. And specify file to save to.
- Channels to save:** Specify the channels to save data for.

The main window displays a graph titled "pA vs ms" showing a step function. The y-axis ranges from -1000 to 1000 pA, and the x-axis ranges from 150 to 350 ms. The graph shows a signal that is near 0 pA until approximately 180 ms, then steps up to about 400 pA, and returns to 0 pA at approximately 300 ms.

At the bottom of the window, the following information is displayed: Amp: Tecella Pico; S/N: 36ffd3053056313428851443; FW: 0x4000000; Driver: v0.119.40; TecellaLab: v0.34

## 4. Display section



Select the channels to display.  
Use the "shift" and "control" keys  
to select multiple channels.

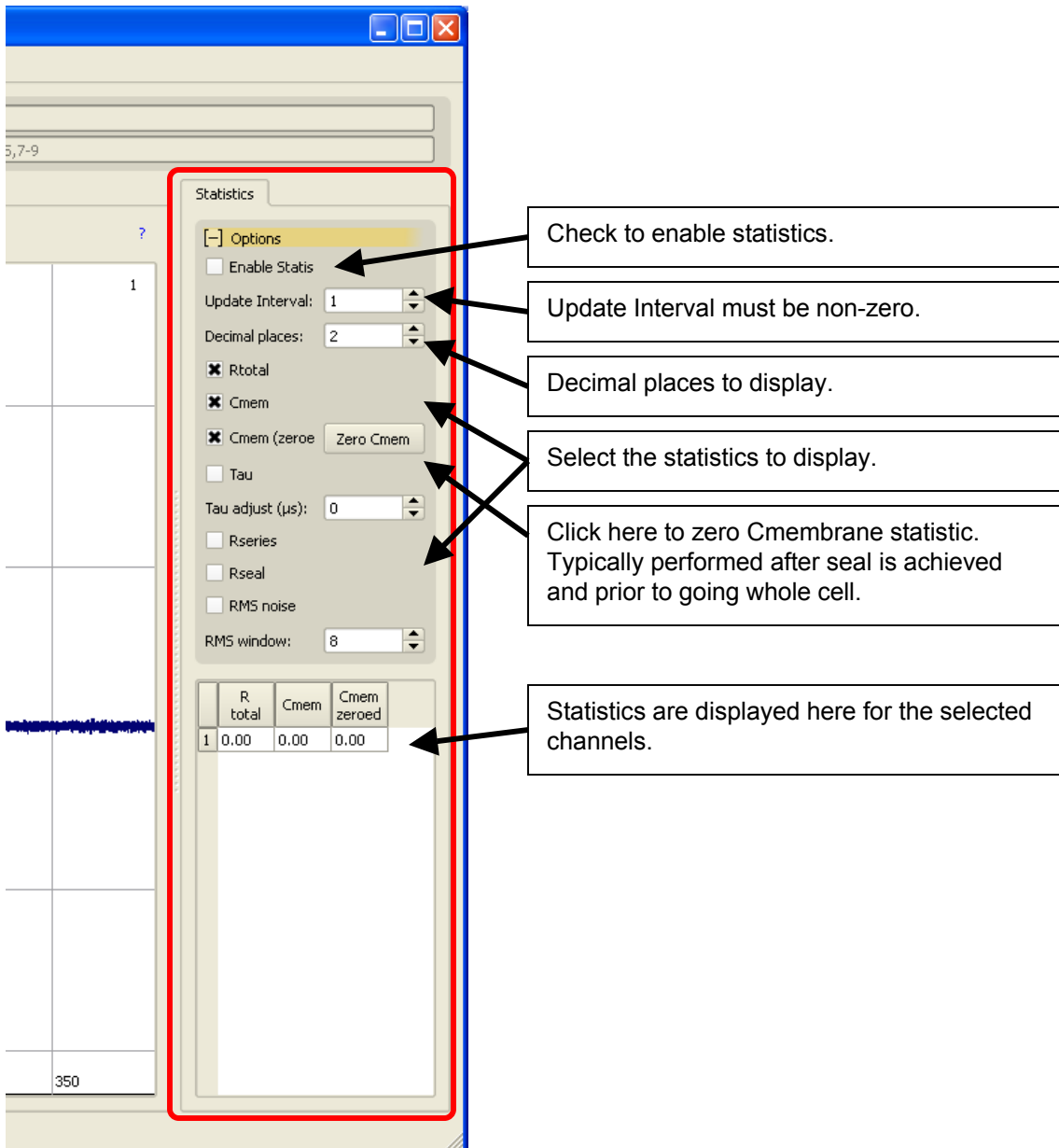
The display window has easy "pan", "zoom",  
and "fit" features.

To pan, hold down left mouse button and  
move the mouse.

To zoom, hold down the right mouse button  
and move the mouse.

To fit the entire waveform, double-click on the  
left mouse button.

## 5. Statistics section



The screenshot shows the 'Statistics' panel in the TecellaLab software. The panel is titled 'Statistics' and contains several settings and a data table. A red box highlights the entire panel. Callouts with arrows point to specific elements:

- Enable Status:** A checkbox that, when checked, enables the statistics. Callout: "Check to enable statistics."
- Update Interval:** A numeric input field set to 1. Callout: "Update Interval must be non-zero."
- Decimal places:** A numeric input field set to 2. Callout: "Decimal places to display."
- Statistics Selection:** A group of checkboxes for selecting which statistics to display:
  - Rtotal
  - Cmem
  - Cmem (zeroed) Zero Cmem
  - Tau
  - Rseries
  - Rseal
  - RMS noise
 Callout: "Select the statistics to display."
- Tau adjust ( $\mu$ s):** A numeric input field set to 0. Callout: "Click here to zero Cmembrane statistic. Typically performed after seal is achieved and prior to going whole cell."
- RMS window:** A numeric input field set to 8.
- Data Table:** A table with 4 columns: R total, Cmem, Cmem zeroed, and an unlabeled column. The first row shows values for channel 1: 0.00, 0.00, 0.00. Callout: "Statistics are displayed here for the selected channels."

	R total	Cmem	Cmem zeroed
1	0.00	0.00	0.00