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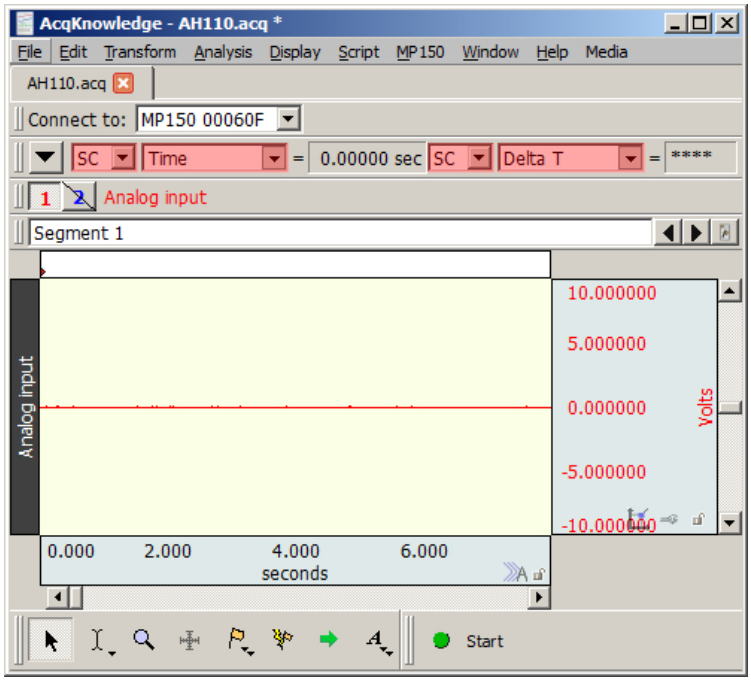
Application Note 110 Amplifier Baseline (Offset) Adjustment



Offset 0 (Baseline centered on 0 Volts)

"Offset" refers to the zero point or baseline of a signal. BIOPAC's biopotential amplifiers (including the DA100) are preset at the factory to Offset 0.

- When recording in AC mode, the signal should be centered on 0.
- When recording in DC mode, the offset of the amplifier will vary with each transducer.

BIOPAC's biopotential amplifiers incorporate specific gain, coupling and filtering options that are appropriate for the resulting signal. Generally, when an electrode or transducer is inserted into the corresponding amplifier module, the amplifier will immediately produce a useful output, with no user adjustments necessary.

However, offset adjustment (signal "zeroing") may be required if the baseline of the amplifier is moved or accidentally altered. On input signals, a limited range in baseline level (DC offset) can be zeroed out. On BIOPAC amplifiers, the ZERO ADJ screw at the top of the front face of each amplifier can be used to adjust the amplifier offset (center the baseline at 0).

To adjust the amplifier offset (baseline):

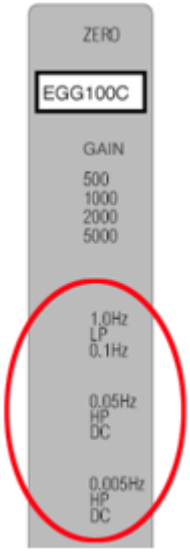
1. Check connections for the desired recording mode:
    - **AC mode** - make sure nothing is plugged into the amplifier unit.
    - **DC mode** - make sure the appropriate transducer is plugged into the amplifier unit.
2. Switch to the highest **Gain** setting on the unit.

Sample Module
Gain Settings

The four-position Gain slider on the side of each amplifier module controls sensitivity; lower Gain settings amplify the signal to a lesser extent than higher Gain settings.

- If the signal seems to be very small for a given channel, increase the Gain.
- If the signal seems to be cropped at +10 Volts or –10 Volts, decrease the Gain.

3. Confirm the recording mode settings on the unit:



Sample Module
Filter Settings

- **AC mode** - at least one high-pass filter must be switched ON.
- **DC mode** - all high-pass filters must be switched OFF, DC must be switched ON.

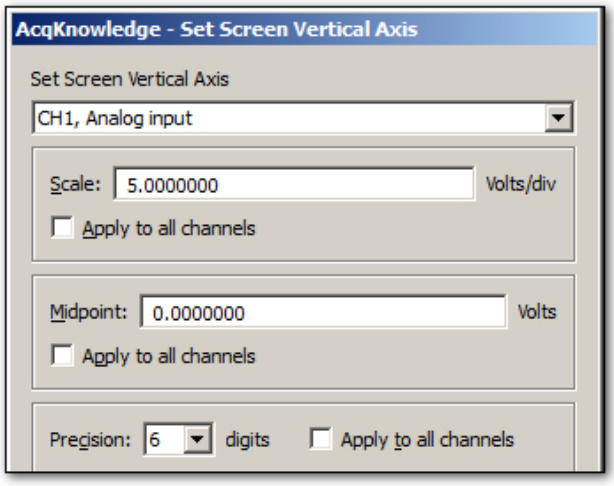
4. Turn the MP160/MP150 acquisition unit on.
5. Launch Acq*Knowledge* and start recording data from the amplifier.
    - The displayed waveform is essentially electrical "noise."
6. Allow 10-15 seconds for the signal to settle and then check the signal:
    - If the signal is centered on 0 then the baseline (offset) is properly centered.
    - If not, continue with the following steps.
7. Switch to the lowest gain setting on the unit and wait for the signal to settle.
8. Turn the ZERO ADJ and check the signal display to bring the baseline (offset) as close to 0 as possible.
9. Turn the ZERO ADJ screw at the top of the front face of the amplifier with a small screwdriver.

WARNING	Turning the screw in the wrong direction for too long will break it and damage the unit!

    - To raise the signal baseline (offset), turn the screw clockwise.
    - To lower the signal baseline (offset), turn the screw counter-clockwise.

- To make finer adjustments, increase the gain on the unit when the baseline (offset) is close to 0.

10. Check the signal display until the baseline is as close to 0 as possible..
    - Continually change the vertical scale to optimize the signal display.
    - Right-click on the scale display to generate the settings dialog.



Vertical Scale Dialog

- Start at 5 Volts per division, then use 1 Volt per division and so on, with 0 as the midpoint.

In some cases the signal will stick at 10 V or +10 V for a while. Continue to turn the screwdriver, making sure you are turning in the proper direction.

For the best possible results, complete this process at the highest gain setting (increase the gain setting on the unit once the signal display is close to 0).

IMPORTANT When cascading modules, ***make sure that each amplifier module is set to a unique channel*** (using the channel selection slider on the top of the module). If two or more connected amplifiers are set to the same channel, contention will result and the amplifier outputs will give erroneous readings.

If you have other questions, please contact BIOPAC at support@biopac.com

Return To Application Note Menu