

Electromyogram Amplifier Module

The Electromyogram Amplifier Module (EMG100A) is a single channel, high gain, differential input, biopotential amplifier designed specifically for monitoring muscle and nerve response activity. The EMG100A is designed for use in the following applications:

- Conventional bipolar EMG measurement
- Muscular reflex studies
- Nerve conduction measurement
- Motor unit potential measurement
- Biomechanics

The EMG100A will connect directly to any of BIOPAC's series of Ag-AgCl lead electrodes. The best choice for electrodes depends on the application, but typically, the EL203 adhesive/disposable snap electrodes are used in conjunction with the LEAD100S pinch lead. Alternatively, if reusable electrodes are required, the EL208S is typically used. Use two shielded electrodes (LEAD100S/EL203 or EL208S) for the signal inputs and one unshielded electrode (LEAD100/EL203 or EL208) for Ground. When using EL208S electrodes, you will also need adhesive disks (ADD208) and electrode gel (GEL100).

The EMG100A has built in drive capability for use with shielded electrode leads. Shielded leads are typically required, as the EMG100A has a frequency response which extends through the 50/60Hz interference bands. The EMG100A is designed to pass both EMG signals and signals associated with nerve responses.

The EMG100A has an additional EMG Integration function. When enabled, the output signal will produce a smoothed wave whose peaks will indicate points of maximum EMG activity. The integrated signal is designed to provide an envelope of EMG activity, allowing the investigator to detect EMG using a substantially lower sample rate. The EMG Integrator consists of a full wave rectifier, followed by a 10Hz, two pole, low pass filter.

EMG100A specifications

Input Impedance

Differential	2M Ω
Common Mode	1000M Ω

Maximum Input Voltage \pm 10V

Frequency Response

Filter Off	10 to 4000Hz
Filter On	100 to 4000Hz

CMRR 100dB minimum

Noise Voltage

(Shorted Input)

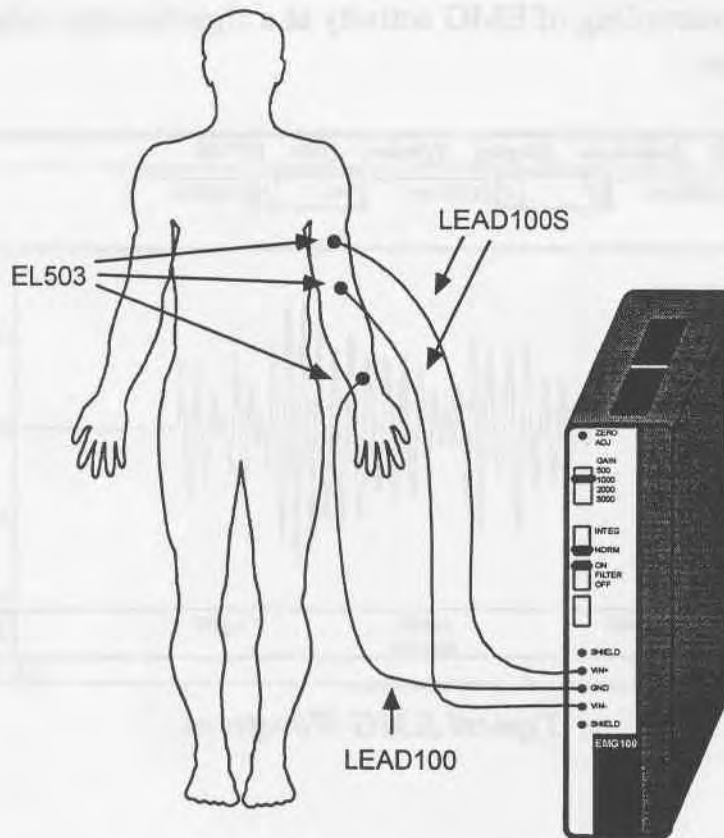
Filter Off	2.2 μ V (rms)
Filter On	2.0 μ V (rms)

Gain Settings

Input Signal Range (pk-pk) Gain

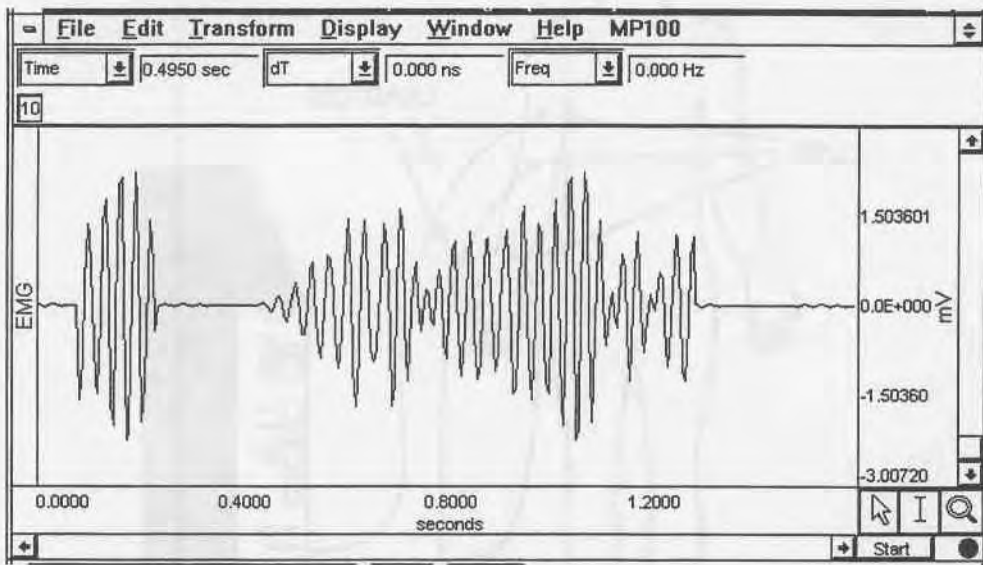
40 mV	x500
20 mV	x1000
10 mV	x2000
4 mV	x5000

The following example shows the electrode connections to the EMG100A for the measurement of EMG activity from the arm biceps.



EMG Electrode Placement Example

The following graph illustrates a typical EMG recording. Waveform peaks indicate points of peak muscle activity. When using the Integration function on the EMG100A, the following waveform would be replaced by a smoothed curve which would follow the positive envelope of the EMG signal. The integration function permits the recording of EMG activity at a significantly reduced sampling rate.



Typical EMG Waveform