

EOG100C - Electrooculogram Amplifier module

The Electrooculogram amplifier module (EOG100C) is a single-channel, high-gain, differential input, biopotential amplifier designed for tracking eye movement. The EOG100C is designed for use in the following applications:

Sleep studies	Nystagmus testing	Vertigo investigations
Eye motion and tracking	REM activity analysis	Vestibular function studies

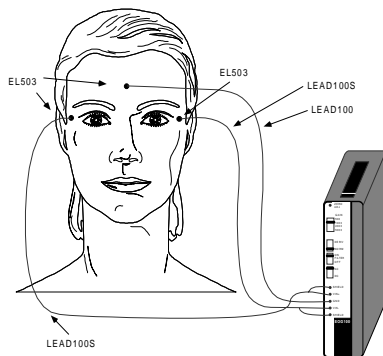
The EOG100C senses the corneal-retinal potential inherent in the eyeball. As the eyes move in the horizontal and vertical planes, these potentials are superimposed to generate a DC voltage variation in the region immediately surrounding the eye sockets.

The EOG100C will connect directly to any of BIOPAC's Ag-AgCl series lead electrodes. For most EOG applications, EL503 electrodes are used. Use two shielded electrode leads (LEAD110S) for the signal inputs and one unshielded electrode lead (LEAD110) for ground.

The EOG100C has built-in drive capability for use with shielded electrode leads. If high bandwidth (resolution) EOG measurements are required, then shielded electrode leads are recommended. When the interference filter is switched on, shielded leads are typically not necessary. The EOG100C is designed to pass the EOG signal to accommodate a large velocity range with minimal distortion.

This module includes an HP selection switch, which permits either absolute (DC) or relative (AC: 0.05Hz HP) eye motion measurements. When performing absolute eye motion measurement, the eye position signal will still decay, but the time constant will be significantly longer than when performing relative eye motion measurement.

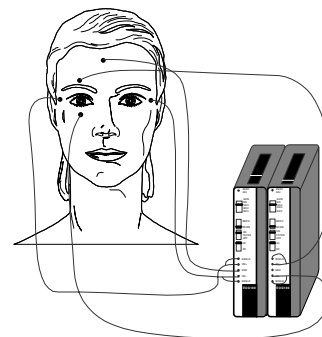
The EOG100C also has an EOG derivative function. When enabled, the output signal will produce a wave that will be directly proportional to the velocity of eye movement. Eye velocity measurement is useful for performing Nystagmus testing. The derivative function is obtained through the use of a specially designed bandpass filter (center frequency of 30Hz, Q=0.8).



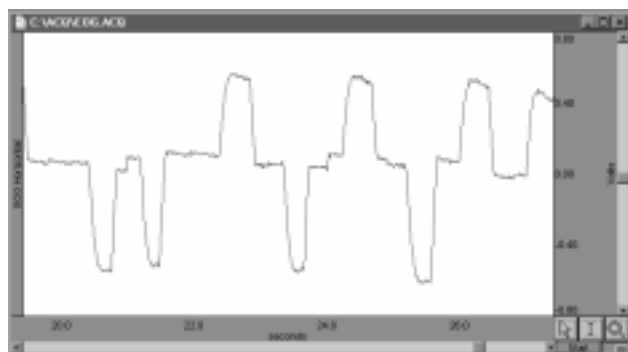
Setup to record horizontal eye movement

To increase accuracy, use electrodes above and below each eye and parallel them with JUMP100C Jumper leads when connecting to the vertical track EOG100C module.

This graph shows a horizontal eye movement recording. The positive peaks indicate eyes looking left. The negative peaks indicate eyes looking right. The derivative of this waveform would indicate the speed of eye motion during this time.



Setup for two EOG100C modules to record vertical and horizontal eye movement



Typical EOG signal

Frequency Response Characteristics

The 0.05Hz lower frequency response setting is a single pole roll-off filter.

Modules are factory preset for 50 or 60Hz notch options, depending on the destination country.

See the sample frequency response plots beginning on page 186:

35Hz LPN (with 50Hz notch)

35Hz LPN (with 60Hz notch)

100Hz LP

EOG100C Calibration

The EOG100C is factory set and does not require calibration. To confirm the accuracy of the device, use the CBLCALC.

EOG100C SPECIFICATIONS

Gain:	500, 1000, 2000, 5000	
Output Selection:	Normal, Derivative output	
Output Range:	$\pm 10V$ (analog)	
Frequency Response		
Low Pass Filter:	35Hz, 100Hz	
High Pass Filter:	DC, 0.05Hz	
Notch Filter:	50dB rejection @ 50/60Hz	
Noise Voltage:	0.1 μV rms - (0.05-35Hz)	
Signal Source:	Electrodes (three electrode leads required)	
Z (input)		
Differential:	2M Ω	
Common mode:	1000M Ω	
CMRR:	110dB min (50/60Hz)	
CMIV--referenced to		
Amplifier ground:	$\pm 10V$	
Mains ground:	± 1500 VDC	
Input Voltage Range	<u>Gain</u>	<u>V_{in} (mV)</u>
	500	± 20
	1000	± 10
	2000	± 5
	5000	± 2
Weight:	350 grams	
Dimensions:	4cm (wide) x 11cm (deep) x 19cm (high)	

See also: JUMP100C

MEC series