

BioAmp universal biological amplifiers

In our choice there are three different amplifier systems. All of them are up-to-date, microprocessor-controlled constructions. **BioAmp** amplifiers are general purpose biological amplifiers. We have got a great choice of different preamplifiers compatible with **BioAmp** to support a number of biological applications. **LinearAmp** amplifiers are designed for conditioning, and processing of biological signals before the analogue to digital conversion in computer-based data acquisition systems. **MultiAmp** amplifiers are optimized for multichannel (8 to 256 channels in a modular system) recording applications.

BioAmp's main fields of applications:

- Multi-channel applications (EEG Brain Mapping, Cortical Depth Mapping, etc.)
- Microelectrode recording (Single-unit activity, Field Potential, Motor Units, etc.)
- Evoked Potentials (EVP)
- Body-surface potentials (ECG, EMG, EEG, ERG, etc.)
- Micropotentials (HIS-bundle, Late Potential, etc.)

BioAmp is a programmable amplifier, but it has no sampling circuits in the signal path at all. In other words, it is controlled by a built-in microcontroller, or a remote computer, but it has got only analogue amplifier circuits. This feature is indispensable when you use averaging techniques for processing its output signal. The internal microcontroller, and the optional digital port (which offers remote control facility from a PC) are optically isolated from the amplifier stages. In this way we could connect all the advantages of high accuracy analogue amplifier circuits, and easy usage of digital control.

Although **BioAmp** is a programmable equipment, it does not need a separate computer to work. According to this fact, it can be used as a stand-alone amplifier (while possessing an optional serial port to communicate with a PC). This stand-alone feature is very comfortable, because the computer is always given, but it should be used to collect, and processing the experimental data. **BioAmp**'s microcontroller on the front panel has got a 3-button keypad, and menu-driven internal software, so it is very friendly to use.

The internal structure of **BioAmp** is modular, so the number of the amplifier channels, and the number of the microcontrollers built in one equipment can be decided independently. Only the aspects of the application field should be considered when we decide, how many amplifier channels, and how many microcontrollers will be placed in the cage of the equipment (for example it is comfortable to use only one microcontroller to program all the EEG channels together, but another controller should be used, if there is a single unit channel in the system, and a third controller is necessary, if there are further channels for ECG).

In the **BioAmp** system the High Pass Filter, the Low Pass Filter, and the Gain have got 8 possible positions. The actual values, realised during the manufacturing process can be ordered with the default parameters, but they can be requested with special values, to meet any special requirements, as well. The default values for the Filter and Gain sections are listed below. Any combination of the parameters can be selected, even the invalid settings (for instance, if the High Pass Filter is set to higher frequency, than the Low Pass Filter). The invalid settings result no faults in the equipment, only the output voltage will be driven to zero.

High Pass Filter:

DC (0 Hz)
0.16 Hz (1 s)
0.53 Hz (0.3 s)
1.6 Hz (0.1 s)
5.3 Hz (0.03 s)
10 Hz
30 Hz
100 Hz

Low Pass Filter:

15 Hz
30 Hz
70 Hz
150 Hz
500 Hz
2 kHz
5 kHz
10 kHz

Gain:

500
1,000
2,000
5,000
10,000
20,000
50,000
100,000

The Notch Filter of the **BioAmp** is tuned to 50 Hz (or optionally to 60 Hz). The Notch Filter can be switched on and off in the software running on the microcontrollers. The rejection ratio of the Notch Filter on its central frequency is 40 dB.

There is a possibility to select the full amplifier chain of **BioAmp** as Inverting or Noninverting characteristics. This selection is also a menu point of the software running on the microcontrollers.

All **BioAmp** amplifiers have got multi-purpose connectors for external preamplifiers. This method gives an opportunity to use other type of input modules to meet all the future demands. Until now we have developed many different preamplifier versions for **BioAmp**. But if you can not find the appropriate model for your special task in our actual choice, we will develop a special preamplifier especially for you. It is our method, how we can improve the features of our equipment. We collect all the notices and feedback of our customers, and we implement their knowledge into the features of **BioAmp**.

If the **BioAmp** is used in human experiments, an additional optical isolator circuit should be ordered for every channels with 4 kV of isolation voltage. The optical isolator does not modify any parameter of **BioAmp**, because the isolator circuit has got unity gain, with noninverting characteristics.

BioAmp family is especially powerful in multi-channel applications, since such a level of reliability and flexibility is unthinkable in a usual analogue amplifier. And the top of all that, our amplifier system offers a very reasonable price level in comparison to the number of channels.

The prices of the different multi-channel **BioAmp** equipments are calculated according to the following algorithm. If the number of the channels in the system is increased according to the powers of 2, the price concerning one channel (the total price divided by the number of the channels) is always reduced by 16 %.

1-channel equipment	1,000.- EURO	(1,000.- EURO / channel)
2-channel equipment	1,680.- EURO	(840.- EURO / channel)
4-channel equipment	2,820.- EURO	(705.- EURO / channel)
8-channel equipment	4,736.- EURO	(592.- EURO / channel)
16-channel equipment	7,952.- EURO	(497.- EURO / channel)

We give you **3 years of full warranty** for **BioAmp**.