EEG/ECoG/ECG/EMG/EOG/... high performance biosignal acquisition

g. *USBamp* generation 3.0
USB BIOSIGNAL AMPLIFIER

Highlights

- real DC-coupled EEG/ECoG/ECG/EMG/EOG biosignal amplifier with wide-range inputs
- 24-bit high resolution ADCs, up to 38.4 kHz sampling with simultaneous S&H for all channels
- internal floating point DSP for digital preprocessing and signal filtering
- 16 input channels per unit, units can be stacked to set up multi-channel systems
- internal amplifier calibration and automatic electrode impedance check
- 4 independent ground potentials per unit to avoid interference between different signal types
- various software solutions available (driver/API, recording software, MATLAB/SIMULINK/LabVIEW ...)
- CE and FDA certified medical device for non-invasive and invasive recordings
- USB 2.0 interface

Multiple units of *g.USBamp* can be stacked to set up a multi-channel system. All channels are sampled synchronously.

g.USBamp works with any type of passive electrodes and strip or grid ECoG electrodes. The *g.GAMMAsys* active electrode system can be used as well. Single cell recordings can be performed in combination with g.tec's spike sensor system.

g.USBamp can be used with a medical power supply or with a rechargable battery pack for up to 10 hours of independent operation.

NEUROSPEC
Research Neurosciences

MathWorks Connections Partner

certified medical device
notified body CE 0636

FDA medical device clearance k060803

rear side view
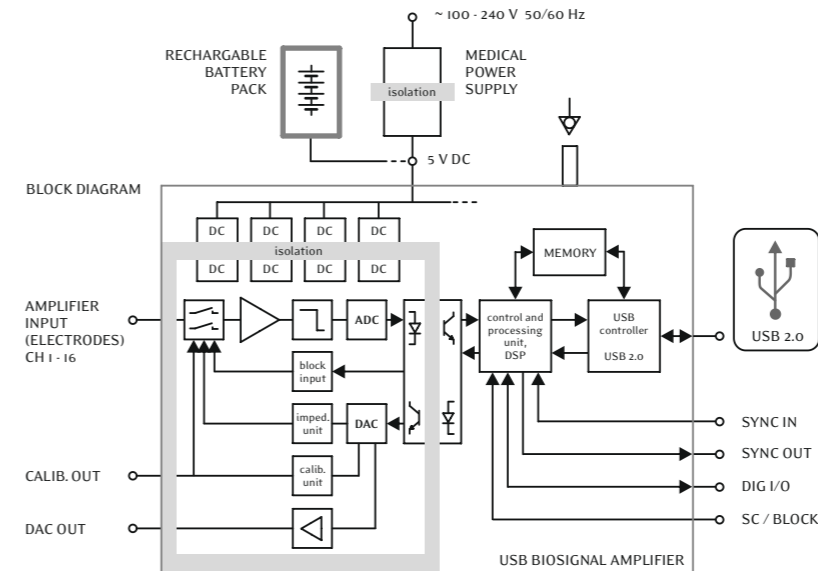
g. *USBamp*
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Sensitivity:	< 30 nV (LSB) - ± 250 mV
Amplifier type:	real DC coupled
16 x ADC:	24 bit (38.4 kHz internal sampling per channel)
2 x DAC:	12 bit
Input channels:	16 mono- / 8 bi-polar (per device, software-selectable)
Noise level:	< 0.3 µV RMS (0.1 - 10 Hz)
Input impedance:	> 100 MOhm
Input connectors:	standard safety connectors and system connectors
Weight:	1000 g
Size:	197 x 155 x 40 mm
Applied part:	type CF
Safety class:	II
Directive of medical products:	93/42/EWG
Standards:	EN60601-1: 1996 (+A1 +A2 +A12 +A13) EN60601-2-26: 2004 EN60601-1-2: 2003 EN60601-2-25 +A1: 2001 EN60601-2-40: 1998

BLOCK DIAGRAM

g.USBamp is equipped with 8 TTL-trigger inputs which are sampled synchronously with all input channels. Also additional digital I/Os are accessable via a rear-side socket. The SC (short cut) input allows to disconnect the electrode sockets from the amplifiers during electrical or magnetical stimulation in order to reduce artifacts.

BCI 2000 enabled

Software options:

API /device driver:
This option enables the integration of the hardware into an existing data recording or processing system by the user or to program applications in C++ or other Windows-based programming languages. *g.USBamp* is also supported by BCI 2000.

The MATLAB-API:
With the MATLAB API the MATLAB Data Acquisition Toolbox can be used to get full access to the recording buffer and to use the whole functionality of *g.USBamp*. The Data Acquisition Toolbox enables a quick and easy implementation of data visualization, processing and storage applications under MATLAB.

High-Speed Online Processing for SIMULINK (or LabVIEW):
Online/real-time biosignal processing and recording with the maximum system speed! *g.USBamp* appears as a block usable in any SIMULINK model. The design of the hardware-interrupt controlled driver allows immediate starting of the model without prior compilation. Also g.tec's specialized *g.RTanalyze* blockset can be used for real-time parameter extraction and data classification. The example shows a BCI system (P300-spelling device) with *g.USBamp* realized in a SIMULINK model.
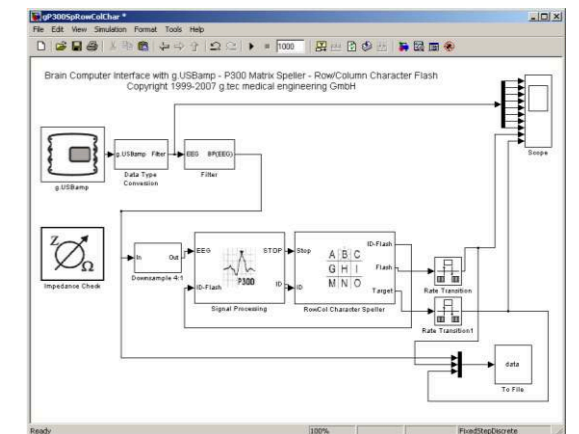
g.Recorder:
Our recording software supports all data acquisition devices provided by g.tec. Comfortable system configuration, data visualization and storage make *g.Recorder* a perfect tool for teaching, research and clinical investigation. *g.Recorder* also supports video-EEG and online biosignal parameter monitoring.

For offline biosignal analysis please see *g.BSanalyze*. This software package includes powerful toolboxes for EEG analysis, high-resolution EEG, ECG (heart rate and HRV analysis) and single beat ECG analysis as well as for biosignal classification.

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