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ML132 Bio Amp

Signal Conditioner Series

Description

The ML132 Bio Amp is a fully isolated, high performance differential amplifier with filter settings optimized for the measurement of a wide variety of biological signals including EEG, ECG and EMG. The ML132 comes equipped with an output jack for headphones or powered speakers, a subject cable and lead wires. The ML132 Bio Amp is approved IEC601-1 (BF body protection) for human connection.



Compatibility

The Bio Amp is compatible with all PowerLab and MacLab models and requires the following ADInstruments software versions or later: LabChart v6, Chart v4 or Scope v3.3.

Visit www.adinstruments.com/downloads/ for Windows and Mac operating system compatibility. For more information please contact your ADInstruments representative.

Accessories suitable for use with the Bio Amp include:

MLA700	Reusable ECG Electrodes
MLA710	Chest ECG Electrodes
MLAWBT9	EEG Flat Electrodes
MLA2340	3-Lead Shielded Bio Amp Cable
MLA2503	Shielded Lead Wires (3 pack)
MLA0112/S	ECG Lead Switch Box

Features and Benefits

- Full electrical isolation from power-line (mains) circuitry to guarantee subject safety
- A low-noise, high-gain differential amplifier specifically designed for biological signal measurements
- Software-controlled low-pass, high-pass and notch filters to remove unwanted signal frequencies
- Audio output for use with EMG or EEG signals and similar

Applications

EEG, ECG and EMG, sensory nerve action potentials (SNAP), visual evoked response (VER), cortical evoked potentials and smooth muscle studies.

Specifications

Input

Connection type:	Six-pin DIN/MS socket to fit 3-Lead Bio Amp Cable (Tronomed D-1340)
Input configuration:	1 isolated differential channel with isolated ground reference
Input impedance:	200 M Ω differential, 30 pF (no cable) or 200 pF (supplied Bio Amp cable and leads) to isolated ground
Safety:	Approved to IEC601-1 BF (body protection) standard



Isolation:	4000 V _{rms} (50 Hz for 1 minute)
Amplification ranges:	$\pm 5 \mu\text{V}$ to $\pm 100 \text{ mV}$ full scale in 14 steps (combined PowerLab and Bio Amp) $\pm 100 \text{ mV}$ $\pm 50 \text{ mV}$ $\pm 20 \text{ mV}$ $\pm 10 \text{ mV}$ $\pm 5 \text{ mV}$ $\pm 2 \text{ mV}$ $\pm 1 \text{ mV}$ $\pm 500 \mu\text{V}$ $\pm 200 \mu\text{V}$ $\pm 100 \mu\text{V}$ $\pm 50 \mu\text{V}$ $\pm 20 \mu\text{V}$ $\pm 10 \mu\text{V}$ $\pm 5 \mu\text{V}$
Gain accuracy:	$\pm 1.5 \%$ all ranges
Non-linearity:	$< 0.1\%$ within range
Noise at various bandwidths:	
• 1 Hz to 5 kHz:	$< 1.3 \mu\text{V}_{\text{rms}}$ ($< 8 \mu\text{V}$ p-p)
• 0.3 Hz to 1 kHz:	$< 0.6 \mu\text{V}_{\text{rms}}$
• 0.1 Hz to 100 Hz:	$< 0.35 \mu\text{V}_{\text{rms}}$ (@ 200 samples/second)

IMRR (isolation mode):	>130 dB (to true earth, 50 to 100 Hz)
CMRR (common mode):	85 dB (typical) @ 60 Hz
Input leakage current:	<3 μ Arms @ 240V, 50 Hz <2 μ Arms @ 120V, 60 Hz
DC blocking:	± 1 V
Baseline restoration:	Automatic

Filtering

Low-pass filter:	Fourth-order Bessel filter, $\pm 3\%$ accuracy
Low-pass options:	Software selectable. Standard: 50, 100, 200, and 500 Hz and 1 and 5 kHz (all at -3 dB); EEG mode: 3, 10, 30, 60 and 120 Hz
High-pass filter:	First-order filter, $\pm 0.25\%$ accuracy
High-pass options:	Software selectable. Standard: 0.1, 0.3, 1, 3, and 10 Hz (all at -3 dB); EEG mode: 0.03, 0.1, 0.3 and 1 seconds
Notch filter:	Second-order filter, -32 dB attenuation; 50 or 60 Hz frequency (automatic sensing)

Output

Analog signal:	± 2.0 V standard; $\leq \pm 4.0$ V over range
Audio:	3.5 mm (0.14") stereo jack; ± 200 mV. Suitable for headphones or powered speakers

Control Port

I ² C port:	Provides control and power. Interface communications rate of ~ 50 Kbits/s.
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Physical Configuration

Dimensions (h \times w \times d):	50 mm \times 76 mm \times 260 mm (1.96" \times 3.0" \times 10.2")
Weight:	770 g (1 lb 11 oz)
Power requirements:	<2 W
Operating temperature range:	0 to 35 °C, 0 to 90% humidity (non-condensing)

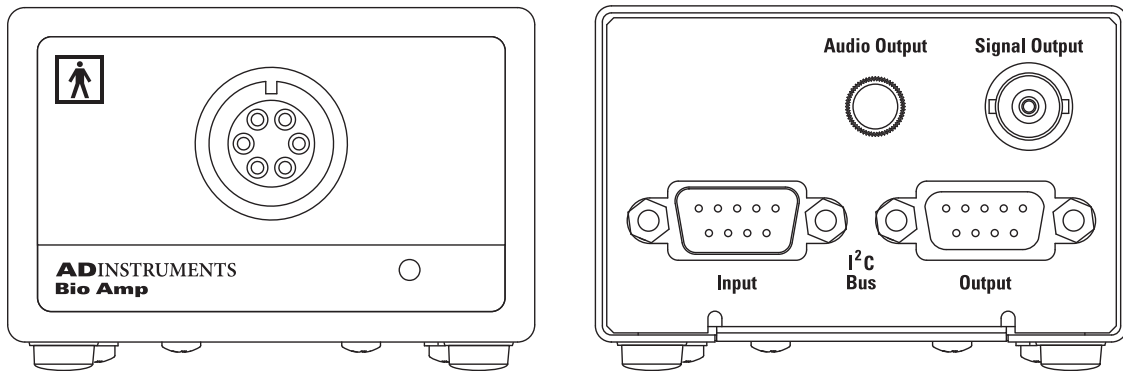
ADInstruments reserves the right to alter these specifications at any time.

WARRANTY: ADInstruments PowerLab Systems, Front-end and Pod Signal Conditioners are warranted against defects in materials and workmanship for a period of 3 years from the date of purchase. Third party products are covered by the manufacturer's warranty. Warranties are void if the product has been damaged due to negligence. Consumables and electrodes are not covered by a warranty. All questions regarding service and warranty should be directed to your nearest ADInstruments representative or one of the offices listed below.

Caution

Read "Statement of Intended Use" on our website or in "Getting Started with PowerLab" before use.

Front and Back Panels



Ordering Information

ML132 Bio Amp

Includes:

I²C Cable (9-pin plug to 9-pin receptacle)

BNC to BNC Cable

MLA2340 3-Lead Shielded Bio Amp Cable

MLA2503 Shielded Lead Wires (3)

Bio Amp Owner's Guide

For use with:

MLA700 Reusable ECG Electrodes

MLA710 Chest ECG Electrodes

MLAWBT9 EEG Flat Electrodes

MLA2340 3-Lead Shielded Bio Amp Cable

MLA2503 Shielded Lead Wires (3 pack)

MLA0112/S ECG Lead Switch Box

ML132-DC-09A



ADINSTRUMENTS.com

North America

Tel: +1 888 965 6040
Fax: +1 866 965 9293
info@adinstruments.com

South America

Tel: +56 2 356 6749
Fax: +56 2 356 6786
info.cl@adinstruments.com

United Kingdom

Tel: +44 1865 891 623
Fax: +44 1865 890 800
info.uk@adinstruments.com

Brazil

Tel: +55 11 3266 2393
Fax: +55 11 3266 2392
info.br@adinstruments.com

Germany

Tel: +49 6226 970105
Fax: +49 6226 970106
info.de@adinstruments.com

Indian Subcontinent

Tel: +91 11 2693 3930
Fax: +91 11 2693 3929
info.in@adinstruments.com

North Asia

Tel: +86 21 5830 5639
Fax: +86 21 5830 5640
info.cn@adinstruments.com

Australia

Tel: +61 2 8818 3400
Fax: +61 2 8818 3499
info.au@adinstruments.com

South East Asia

Tel: +60 3 8024 5296
Fax: +60 3 8023 6307
info.sea@adinstruments.com

New Zealand

Tel: +64 3 477 4646
Fax: +64 3 477 4346
info.nz@adinstruments.com

Japan

Tel: +81 52 932 6462
Fax: +81 52 932 6755
info.jp@adinstruments.com

International

Tel: +61 2 8818 3400
Fax: +61 2 8818 3499
info.au@adinstruments.com

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