

## **FE234 Quad Bio Amp**

*Signal Conditioner Series*

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### **Description**

The ADInstruments Quad Bio Amp consists of eight galvanically isolated, high performance differential amplifiers a common subject ground connection. It is ideal for multiple low-level recordings. The FE234 is equipped with an audio output jack for headphones or powered speakers. Approved to the IEC601-1 BF (body protected) standard.



### **Compatibility**

The Quad Bio Amp is compatible with PowerLab 30 series and above as well as LabChart 8.1.6 and newer on both Windows and Mac.

Visit [www.adinstruments.com/support/software](http://www.adinstruments.com/support/software) for Windows and Mac operating system compatibility. For more information please contact your ADInstruments representative.

Accessories suitable for use with the Quad Bio Amp include:

MLA710	Chest ECG Electrode
MLAWBT9	EEG Flat Electrodes
MLA0311	Lead Wires (Snap On)
MLA415	Biopotential Accessory Kit

### **Features and Benefits**

- Full electrical isolation from power-line (mains) circuitry to guarantee subject safety
- 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 for particular uses
- Audio output for use with EMG signals and similar

### **Applications**

Suitable applications include EEG, ECG, EMG, EOG, sensory nerve action potentials, visual evoked response, cortical evoked potentials and smooth muscle studies.

## Specifications

### Input

Connection type:	9 x 1.5 mm pin shrouded male socket to suit single pin 1.5 mm
Input configuration:	Four isolated differential channels with common isolated ground reference or right leg drive
Input impedance:	>1 G $\Omega$ differential, <100 pF (no cable) to isolated ground
Isolation:	4000 V <sub>rms</sub> (50 Hz for 1 minute)
Input ranges:	$\pm 100 \mu\text{V}$ to $\pm 100 \text{ mV}$ full scale in 10 steps (combined PowerLab and Bio Amp) $\pm 100 \text{ mV}$ $\pm 50 \text{ mV}$ $\pm 20 \text{ mV}$ $\pm 10 \text{ mV}$ $\pm 5 \text{ mV}$ $\pm 2 \text{ mV}$ $\pm 1 \text{ mV}$ $\pm 500 \mu\text{V}$ $\pm 200 \mu\text{V}$ $\pm 100 \mu\text{V}$
Gain accuracy:	$\pm 1.5\%$ all ranges
Non-linearity:	<0.2% within range
Noise at various bandwidths:	
• 1 Hz to 10 kHz:	<1.3 $\mu\text{V}_{\text{rms}}$ (< 8 $\mu\text{V}$ p-p)
• 0.3 Hz to 1 kHz:	<0.7 $\mu\text{V}_{\text{rms}}$
• 0.1 Hz to 100 Hz:	<0.35 $\mu\text{V}_{\text{rms}}$
IMRR (isolation mode):	>160 dB (to non-isolated earth, 50 Hz)
CMRR (common mode):	>75 dB typical (150K electrode impedance, 5K imbalance @50 Hz and 60 Hz) >100 dB typical (Balanced electrode impedance @50 Hz and 60 Hz)
Input leakage current:	<4 $\mu\text{A}_{\text{rms}}$ @ 240V, 50 Hz
DC tolerance:	$\pm 370 \text{ mV}$
Baseline restoration:	Automatic or manual

## Filtering

Low-pass filtering:	Frequencies software-selectable. 50, 100, 200, 500, 1000, 2000, 5000, 10000 Hz, Off
High-pass filtering:	Frequencies software-selectable. D.C, 0.0003, 0.001, 0.003, 0.01, 0.03, 0.1, 0.3, 1, 3, 10, 30, 100, 200, 300 Hz
Adaptive main filter:	50 or 60 Hz frequency (Refer to PowerLab owner's guide for more information)

## Output

Analog signal:	±5.0 V maximum
Audio output:	3.5 mm stereo output suitable for direct headphone or powered speaker connection. Output selectable from software.

## Control Port

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

Dimensions (h × w × d):	70 mm × 240 mm × 260 mm
Weight:	2.5 kg
Power requirements:	~10 W
Operating conditions:	5 to 35 °C, 0 to 90% humidity (non-condensing)
Storage conditions:	0 to 40 °C, 0 to 95% humidity (non-condensing)

## Regulatory Information

Safety:	Complies with IEC 60601-1:2012 (tested by TUV Singapore)
EMC:	Complies with IEC 60601-1:2014 (tested by EMC Technologies, Sydney, Australia)
Equipment:	Use only with an ADInstruments 35 series PowerLab. The PowerLab must be connected to safety earth via the power supply cable to ensure electrical safety

Body protection rating  
(Applied parts only):



(BF)

This equipment is not intended to be modified or serviced by the user.

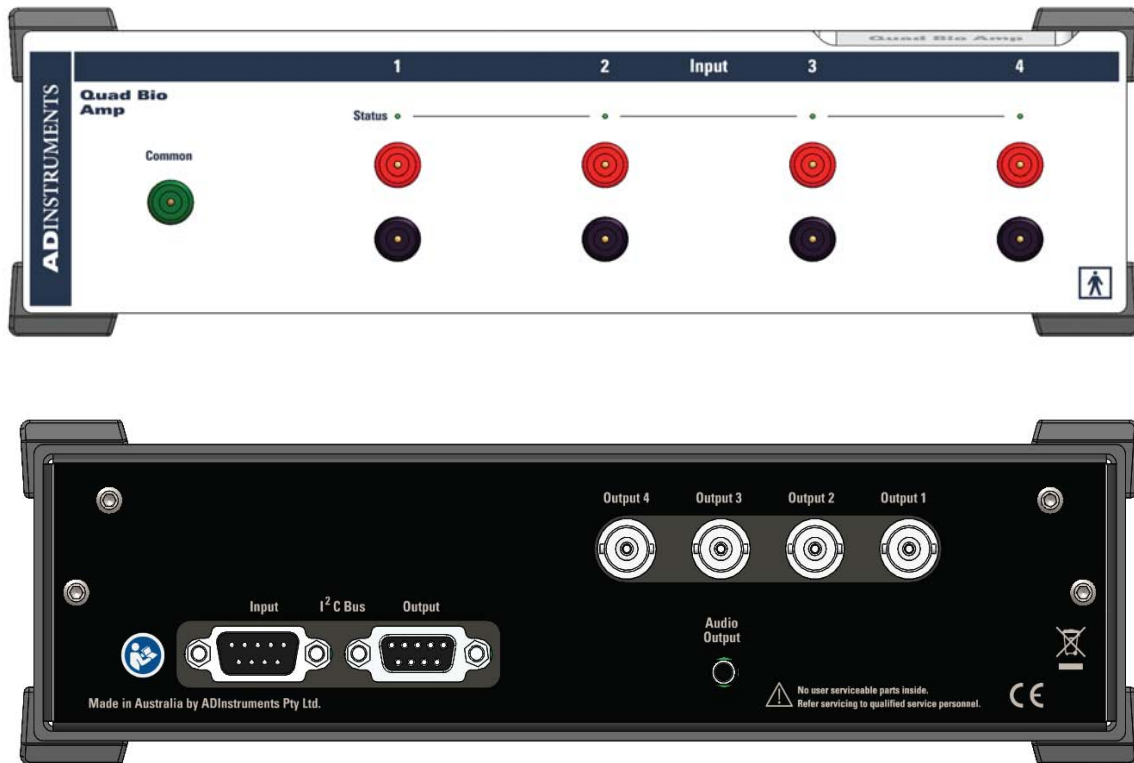
No user serviceable parts inside. Refer servicing to authorised ADInstruments service centre.

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

## Caution

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

## Front and Back Panels



## Ordering Information

FE234 Quad Bio Amp

Includes:

MLAC27 Quad BNC-BNC Cable (1m)

MLAC02 DB9M-DB9F I<sup>2</sup>C Cable (400mm)

MLA0310 Lead Wires, Unshielded (1.8m)



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ISO 9001:2008 Certified Quality Management System

WARRANTY: ADInstruments PowerLab data acquisition units (Product Number Prefix: PL), Front-end Signal Conditioners (Product Number Prefix: FE) are warranted against defects in materials and workmanship for a period of 5 years from the date of purchase. Other PowerLab data acquisition units and ADInstruments manufactured Front-end and Pod Signal Conditioners, and Instruments are warranted of 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.