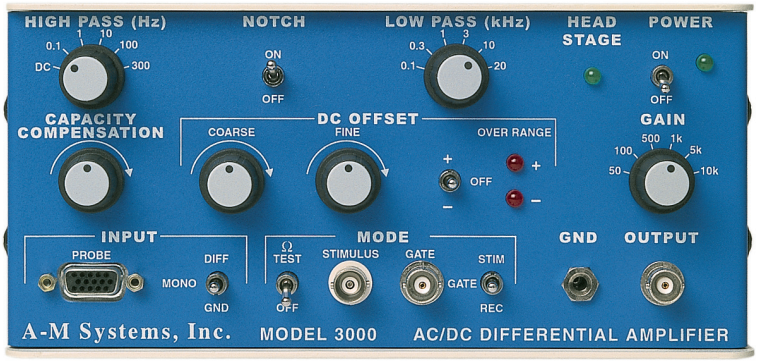
# Model 3000

# AC / DC Differential Amplifier




The Model 3000 AC/DC Differential Amplifier is designed for low-noise recordings from excitable tissue using low impedance (<1.5 megohm) electrodes. When paired with an optional x50 gain headstage, the Model 3000 is perfect for single cell recordings using high-impedance glass or metal microelectrodes.

This single-channel amplifier is packed full of features to accommodate your specific instrumentation requirements, yet fits into a compact enclosure for convenient placement in the lab. The standard input consists of a twisted-pair cable with an active shield. The ends of the cable are left bare to be wired to your input device. The input mode can be set for either differential or single-ended recordings.

External stimulus generators can be easily used with the Model 3000 via the stimulus input. During stimulation, the Model 3000 acts as a current monitor, measuring the current passing through the electrode at gain levels from 5mV/µA to 1V/µA.

The Model 3000 provides a complete set of precision controls, allowing maximum control over stimulus and recording operations. The input can be amplified from 50 to 10,000 times in both DC and AC modes. A high resolution DC Offset adjustment is available up to ±250mV, using Fine and Coarse adjustment controls. High Pass, Low Pass, and Notch Filters offer wide frequency selectivity. The small size of the amplifier and remote power supply offers the advantage of placing the amplifier next to the experimental set up, or within a Faraday cage with minimal power-line interference.

Common applications for the Model 3000 AC / DC Amplifier include, but are not limited to:

- Single Cell Action Potentials (with optional headstage)
- Multiple-Unit Recordings
- EEG / EMG / EKG / ERG recordings
- Long-term Potentiation
- Evoked Potentials

The Model 3000 AC / DC Amplifier is designed for research grade recording quality, with a straightforward interface that also makes it ideal for teaching applications.

- AC and DC signal processing
- Six Gain levels from x50 to x10,000
- Low noise
- Optional headstage for use with high impedance electrodes
- Notch filter for power line frequency
- *In situ* electrode impedance measurement
- Can record from or stimulate through electrodes without changing connections
- Current monitor during stimulation
- External gate signal input controls instrument mode
- Includes rack mount hardware
- 3-year warranty

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## Application Notes:

*Optional Headstage*

Optional headstages are available for use with high impedance electrodes. Typically, they are recommended when the impedance of the electrode exceeds 1 to 2 megohms. The headstage supports all instrument functionality, including record, stimulate and impedance modes. When configured for use with a headstage, all recordings are differential. Monopolar recordings can be made by shorting the reference input. Headstage cable length is 5 feet, but can be extended up to 10 feet long.

*optional x50 Headstage Probe*

## Specifications

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|---|---|
| Gain* | 50, 100, 500, 1000, 5000, 10000 |
| High Pass Filter* | DC, 0.1, 1.0, 10, 100, and 300 Hz; -40 dB / decade |
| Low Pass Filter* | 100, 300, 1000, 3000, 10000, and 20000 Hz; -40 dB / decade |
| Noise | 1.8µV, p-p (10Hz - 10kHz); 0.1fA/Hz at 1kHz |
| Input impedance | $10^{15}$ Ohms \|\| 1pF |
| Initial bias current | ±10.0fA, typical |
| Maximum differential signal* | 200mV with ±250mV offset |
| Common mode rejection | 90dB |
| Capacity compensation | -4 - 50pF |
| Other Features | Can pass stimulation current direct to electrodes |
| | Built-In current monitor during stimulation |
| | *In-situ* electrode impedance measurement (up to 40 megohms) |

** Can customize these values for an additional fee. Contact A-M Systems or your distributor for information*

## References


Ros H et al. (2009) Neocortical networks entrain neuronal circuits in cerebellar cortex. *J Neuroscience* 29(33):10309-10320

Miocinovic S et al., (2007) Stereotactic neurosurgical planning, recording, and visualization for deep brain stimulation in non-human primates. *J Neurosci Methods* 162(1-2): 32-41

Miranda A et al., (2006) Neonatal nociceptive somatic stimulation differentially modifies the activity of spinal neurons in rats and results in altered somatic and visceral sensation. *J Physiol* 572:775-787


## Ordering Information

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| For use on 220 V / 50 Hz power systems | Product #910005 *Country-specific power cords are not supplied.* |
| For use on 110 V / 60 Hz power systems | Product #910000 |
| Optional Headstage | Product #910500 |

All units include a product manual and rack mounts.