



HS-18 User Manual

**A preamplifier headstage with 18 channels of unity gain including
16 electrode channels and 2 references.**

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Revision 1.0
5/10/2012

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1 Document Overview

This document will describe the HS-18 features, connector descriptions, power supply requirements, and mounting.

2 HS-18 Overview

The Neuralynx HS-18 Amplifier is the active electronic part of the Headstage/Tether system. It provides 16 channels of unity gain amplification, two references, ground, and differential stimulation lines. One end of the HS-18 provides connections to an Electrode Interface Board(EIB) like the Neuralynx EIB-18. The other end connects to a 28-conductor tether. The HS-18 is approximately 20 mm high and 10 mm wide. Weighing only 600mg, the HS-18 is a good choice for use with small animals. The HS-18 uses low noise, low power, and low input bias current op amps instead of the ω Source Follower FET circuit typically used by other headstage manufacturers. The op amps used on the Neuralynx HS-18 have many advantages:

- Precise unity gain greatly improves the Common Mode Rejection Ratio (CMRR), preserving the integrity of the amplified signal
- High performance for the entire recording system for artifact and other common mode noise signal rejection
- Lower output impedance reduces noise susceptibility of the tether and other signal cabling
- Provide critical antistatic protection on each input channel
- Ensure low input bias current levels
- Eliminate signal distortion

3 Input Connector Pinout

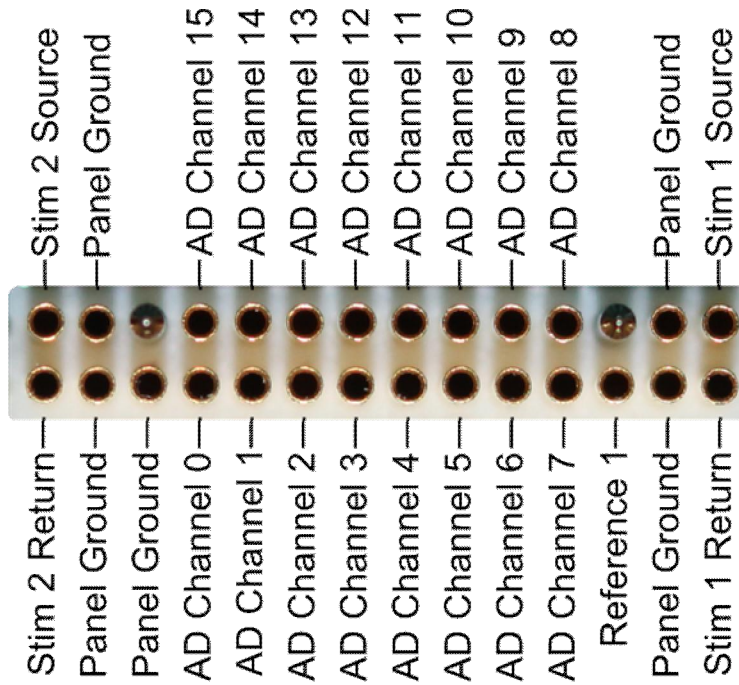


Figure 1 Input Omnetics Connector Pinout

4 Stimulus Connections

As shown in the above figure, the stimulus connections are passed through the headstage to the input connector. EIBs like the EIB-18 contain four vias connected to these stimulus channels.

5 Tether Signal Connections

A 37 pin microDB(uDB37) connector made by AirBorn is used for the headstage tether connection. The Litz tether cable consists of 28 shielded conductors. The tether wires are soldered directly to the HS-18 circuit board to eliminate the mass of an additional connector. Figure 1 shows the pinout of the uDB37 connector.

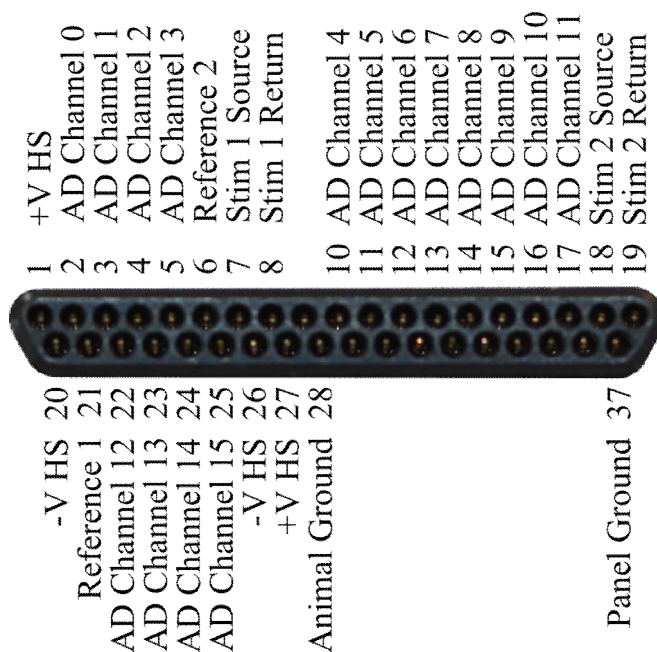


Figure 2 Male μ DB37 Connector

- Pin 21 is the dedicated reference channel.
- Also note that pin 28, Animal Ground, is connected to the HS-18 Panel Ground at the circuit board. This is a non-current-carrying ground signal which is the same as on the HS-27.
- Pin 37 is the HS-18 Panel Ground.
- +5V power is connected to pin 27. -5V is connected to pin 26. This pinout for buffer op amp power is the same as on the HS-27.
- Pin 7 is Stim 1 Source and pin 8 is Stim 1 Return. Pin 18 is Stim 2 Source and pin 19 is Stim 2 Return. These connections are stimulus source and return lines.

6 Power Supply Requirements

The HS-18 amplifier requires +5V and -5V for the buffer op amps. Current draw is about 4 mA.

Because op amps are used for the unity gain buffer amplifiers, special care and attention must be given to the power supply design, power application and power removal. The input protection circuitry will lower the input impedance if the input voltage exceeds power supply voltage. This can occur if the input voltage exceeds the power supply voltage or by the loss of power supply voltage. The Neuralynx Digital Lynx SX contains power supplies which properly sequence power supply voltage and monitor headstage currents.

7 Mounting the Headstage to the EIB

The HS-18 connects to EIBs like the EIB-18. When connecting the HS-18 to an EIB be sure to align the guideposts on the HS-18 with the guide post holes on the EIB. Headstage power should be turned off when connecting and disconnecting to the animal.

8 Using the SM-18 Signal Mouse

Refer to the Signal Mouse User Manual.