

## **HS-18-CNR-MDR50 User Manual**

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

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# 1 Document Overview

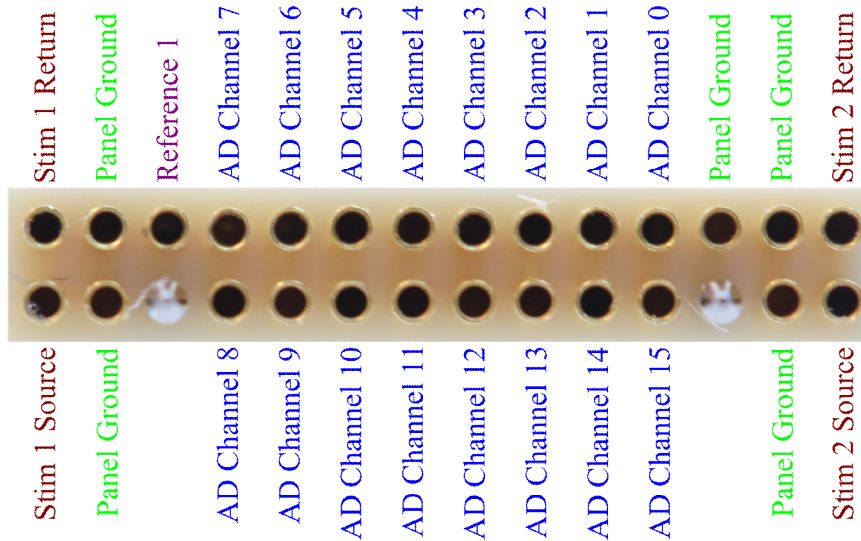
This document will describe the HS-18-CNR-MDR50 features, connector descriptions, power supply requirements, and mounting.

## 2 HS-18-CNR-MDR50 Overview

The Neuralynx HS-18-CNR-MDR50 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-CNR-MDR50 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-CNR-MDR50 is approximately 20 mm high and 10 mm wide. Weighing only 600mg, the HS-18-CNR-MDR50 is a good choice for use with small animals. The HS-18-CNR-MDR50 uses low noise, low power, and low input bias current op amps instead of the  $\delta$ Source Follower FET circuit typically used by other headstage manufacturers. The op amps used on the Neuralynx HS-18-CNR-MDR50 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



26 Pin Female Nano Omnetics Connector  
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 50 pin MDR connector made by 3M is used for the headstage tether connection. The Cooner cable consists of 28 conductors. The tether wires are soldered directly to the HS-18-CNR-MDR50 circuit board to eliminate the mass of an additional connector. Figure 2 shows the pinout of the MDR-50 connector.



Male MDR-50 Connector

Figure 2 HS-18-CNR-MDR50 Output Pinout

- Pin 27 is the dedicated reference channel.
- Also note that pin 34, Animal Ground, is connected to the HS-18-CNR-MDR50 Panel Ground at the circuit board. This is a non-current-carrying ground signal.
- Pin 43 is the HS-18-CNR-MDR50 Panel Ground.
- +5V power is connected to pin 1 and 33. -5V is connected to pin 26 and 32.
- 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-CNR-MDR50 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-CNR-MDR50 connects to EIBs like the EIB-18. When connecting the HS-18-CNR-MDR50 to an EIB be sure to align the guideposts on the HS-18-CNR-MDR50 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.