

# ZIF-Clip® ZD Digital Headstages



## ZIF-Clip® ZD Overview

ZD ZIF-Clip® digital headstages use Intan RHD2000 amplifier chips to digitize physiological recordings directly inside the headstage. Digitized signals are routed to a PZ5 with a digital input board for transfer to an RZ base station. A single PZ5 digital input board can support up to 96 channels via a direct connection to any of the ZD headstage form factors (32, 64, or 96 channels). The headstage cable is detachable for easy, low-cost replacement.

The ZIF-Clip® headstage (Patent No. 7540752) features an innovative, hinged headstage design that ensures quick, easy headstage connection with almost no insertion force applied to the subject. ZIF-Clip® headstage contacts seat inside the probe array and snap in place, firmly locking the headstage and probe with very little applied pressure. These self-aligning headstages provide long lasting low insertion performance for a variety of channel number and electrode configurations. An aluminum finish provides increased durability.

These headstages are recommended for use with probe that have an impedance in the range of 20 Kohm to 2 Mohm. By default, ground and reference are separate on all ZIF-Clip® headstages yielding a differential configuration. Reference and ground may be tied together on the headstage adapter or ZIF-Clip® microwire array for single-ended configurations.

### Part Numbers:

ZD32 32 – channel Digital ZIF-Clip® headstage

ZD64 64 – channel Digital ZIF-Clip® headstage

ZD96 96 – channel Digital ZIF-Clip® headstage

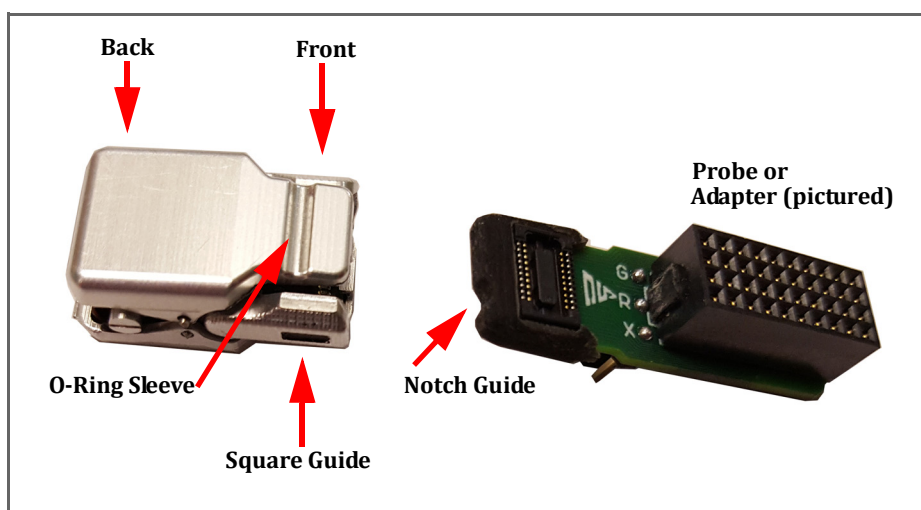
ZD-CBL – channel Digital ZIF-Clip® headstage cable

## Adapter and Probe Connection



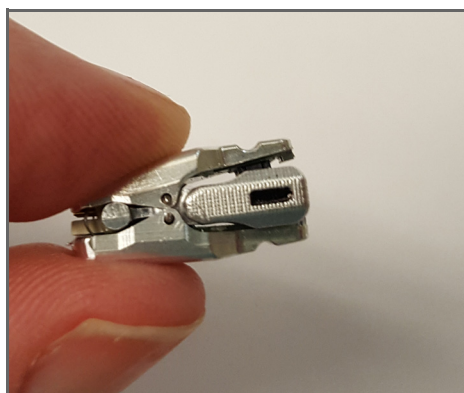
The headstage has sensitive electronics. Always ground yourself before handling.

ZIF-Clip® headstages are designed to automatically position the high density connectors on the headstage and probe (or adapter).

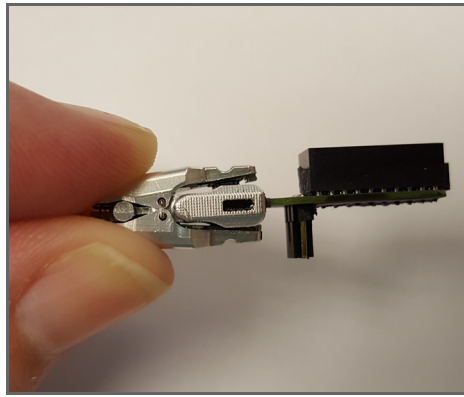


ZIF-Clip® Connection (ZD32 headstage and ZCA-NN32 adapter)

Connect probes and adapters to the headstage as described below.



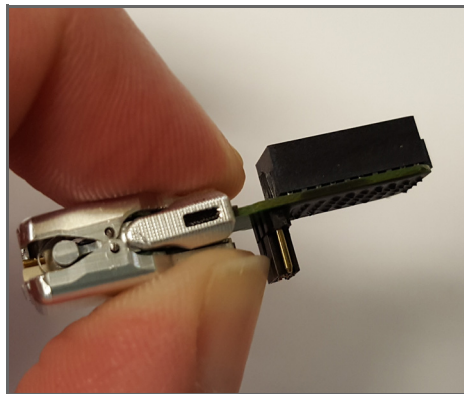
Firmly press and hold the **back** to open the headstage.



Align the **notch guide** of connector to the **black square guide** of the fully opened headstage then move headstage into position.



**WARNING!** The ZIF-Clip® headstage must be held in the fully open position while being slid into position. The headstage should only be closed when fully engaged. Sliding the headstage into position while applying pressure to the tip will **permanently damage** the ZIF-Clip® headstage and micro connectors.



Press the **front** of the headstage together as shown to lock the connector in place. You should hear an audible click when the locking mechanism is engaged.

## ZIF-Clip® Headstage O-Rings

All ZIF-Clip® headstages are shipped with two o-rings for additional connection security. Gently slip the o-ring onto the headstage sleeve and then roll the o-ring towards the back of the headstage. Connect the probe or adapter to the headstage as described above. Once the connection is secure, roll the o-ring forward until it settles into the sleeve on the front of the headstage.

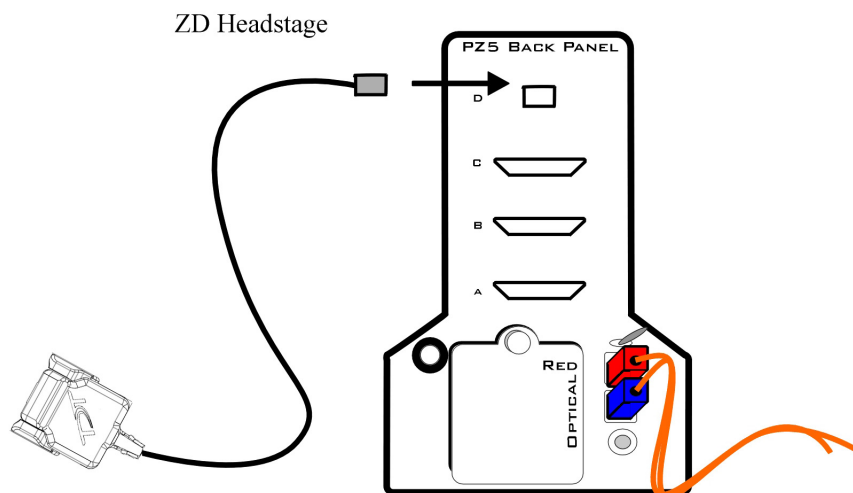


O-Ring Use and Positioning

## ZIF-Clip® Digital Headstages PZ5 Connection

The ZD ZIF-Clip® digital headstage uses a single detachable SPI Interface Cable that transmits all channels to a digital input board, housed in a PZ5 neurodigitizer. The PZ5 will automatically detect the number of channels in the headstage. If more

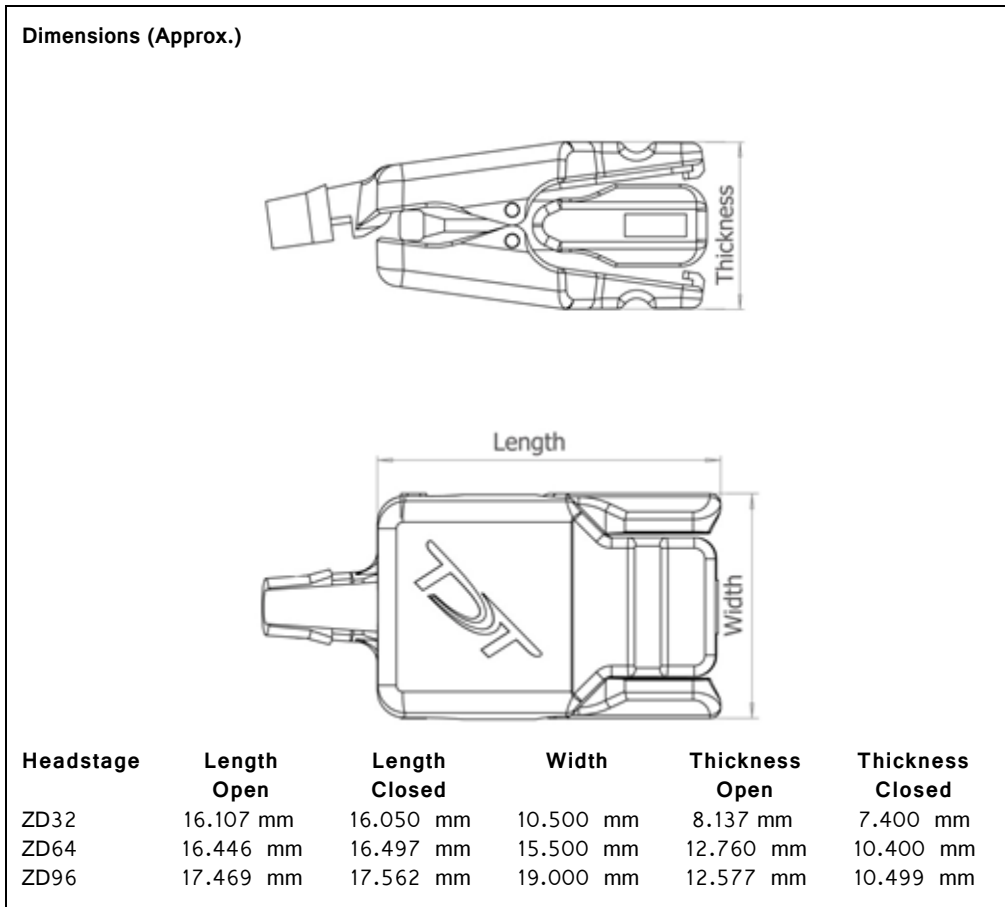
than one headstage is used, all channels will be concatenated together, starting with connector “-A-”, to create the output signal to the RZ base station. The total channel count of all connected headstages cannot exceed the maximum channel count for the PZ5. See “PZ5 NeuroDigitizer” on page 6-29, for more information.



ZIF-Clip® ZD Digital Headstage to Preamplifier Connection Diagram

## ZIF-Clip® Digital Headstage Technical Specifications

<b>Input referred noise</b>	2.4 $\mu\text{V}_{\text{RMS}}$ Typical. Varies slightly (< 15%) with amplifier bandwidth
<b>Input Impedance</b>	1300 Mohm, 10Hz 13 Mohm, 1kHz TDT recommends using less than 2 Mohm electrodes
<b>A/D</b>	Up to 96 channels, 16-bit successive-approximation
<b>A/D Sample Rate</b>	Up to 24414.0625 Hz
<b>Maximum Voltage In</b>	+/- 5 mV
<b>Frequency Response</b>	3 dB: 0.1 Hz - 10 kHz
<b>Anti-Aliasing Filter</b>	3rd order low-pass (-18 dB per octave)
<b>Distortion (typical)</b>	< 0.8%



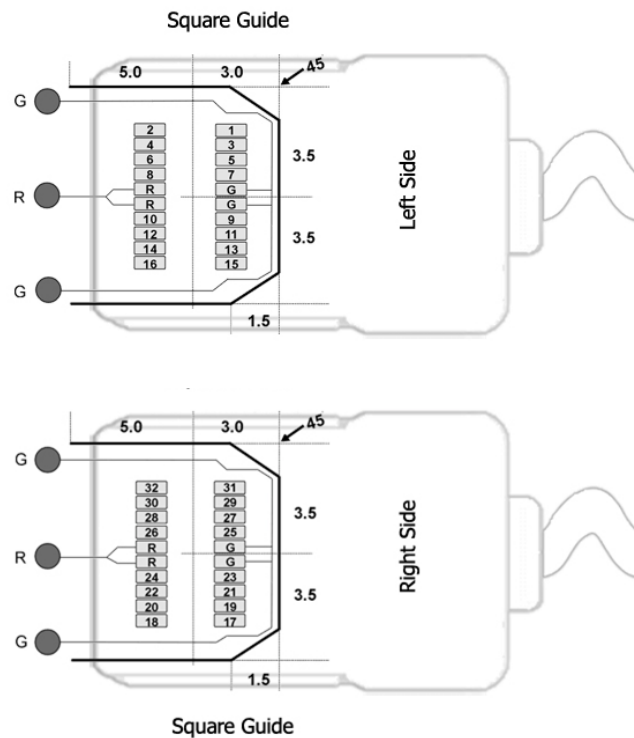
**Important!** When using multiple headstages, ensure that a single ground is used for all headstages. This will avoid unnecessary noise contamination in recordings. See “Headstage Connection Guide” on page 6-99, for more information.

## ZIF-Clip® Headstage Pinouts

If you are interested in using a third party electrode see “ZIF-Clip® Headstage Adapters” on page 12-9. If there is no adapter offered for the desired electrode, the following diagrams show the headstage pinouts (channel connections to the amplifier) and board dimensions for connectors to match ZIF-Clip® headstages. A black square guide is used to align the headstage to ZIF-Clip® compatible connectors and can be used in the diagrams below to orient “left” and “right” sides of the headstage shell.

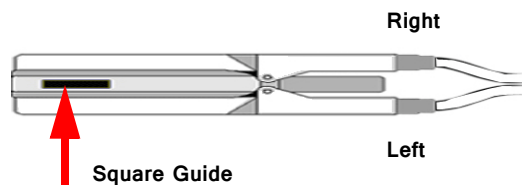
### 16- and 32-Channel Headstage Pinouts

Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.



G Common/Ground Connection

R Reference Connection



**Note:** The 16-channel ZIF-Clip® headstage does not have any pins connected on the right side of the headstage; the Hirose connector is there for mechanical support. See Hirose specification for recommended footprint.

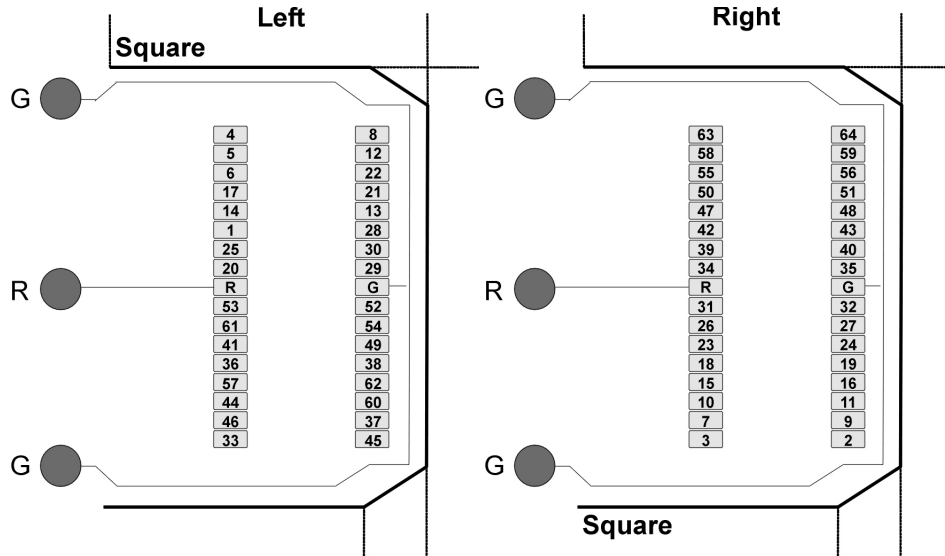
#### Hirose Connectors:

ZD16 - DF30FC-20DS-0.4V x 1

ZD32 - DF30FC-20DS-0.4V x 2

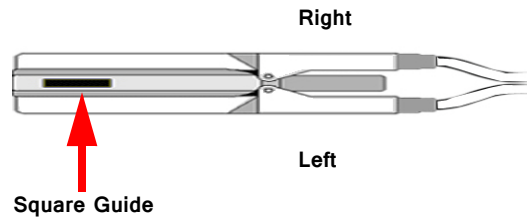
### 64-Channel Headstage Pinouts

Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.



G Common/Ground Connection

R Reference Connection



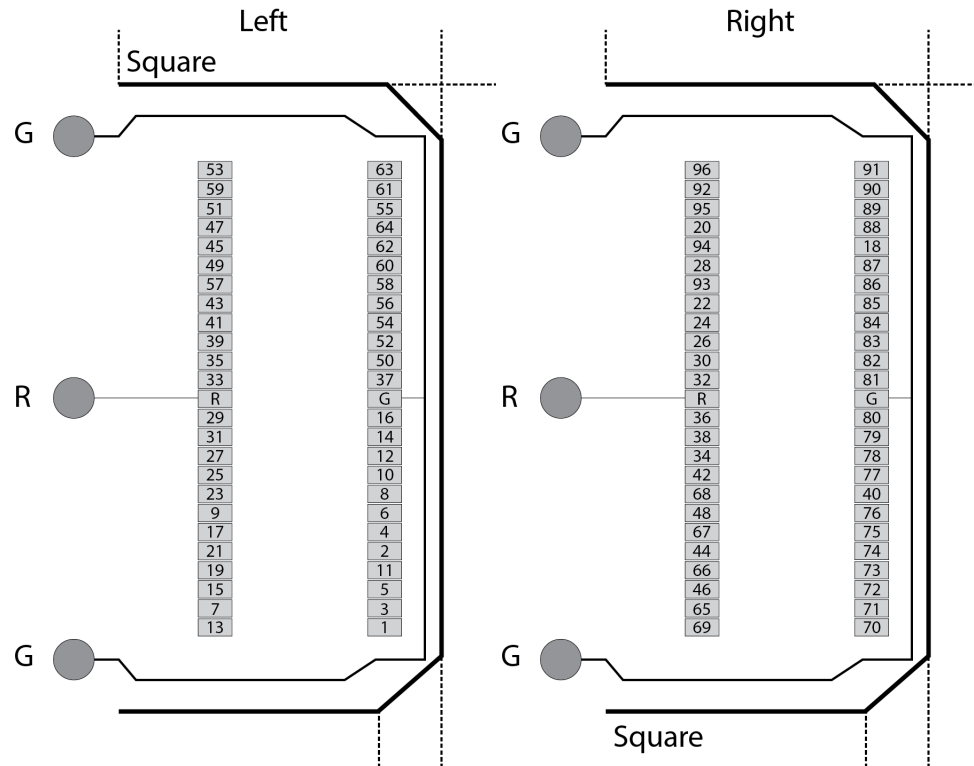
See Hirose specification for recommended footprint.

#### Hirose Connectors:

ZD64 - DF30FC-34DS-0.4V x 2

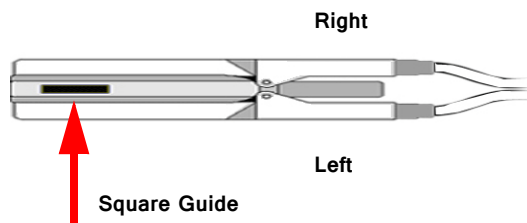
### 96-Channel Headstage Pinouts

Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.



G Common/Ground Connection

R Reference Connection



See Hirose specification for recommended footprint.

#### Hirose Connectors:

ZD96 - DF30FC-50DS-0.4V x 2