

ZIF-Clip® ZD Digital Headstages

Hardware Reference



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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 or Subject Interface (SIM) with a digital input board for transfer to an RZ base station. A single PZ5/SIM digital input board can support up to 128 channels via a direct connection to any of the ZD headstage form factors (32, 64, 96, or 128 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 referential 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

ZD128 - 128-channel Digital ZIF-Clip® headstage

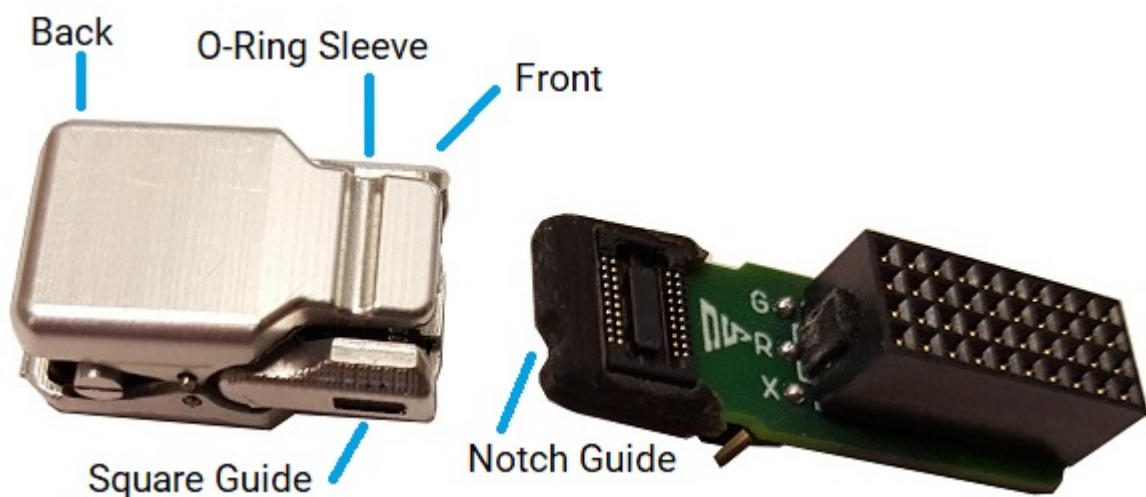
ZD-CBL - digital headstage cable

Adapter and Probe Connection

Warning

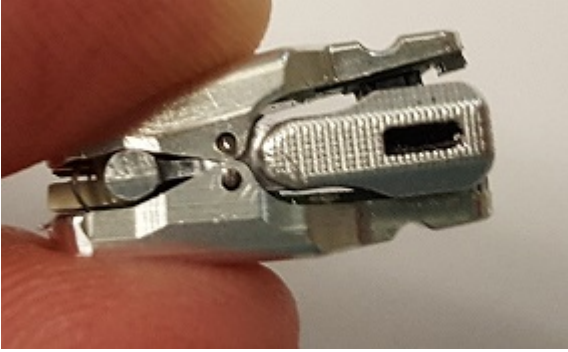
The headstage has sensitive electronics. Always ground yourself before handling.

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

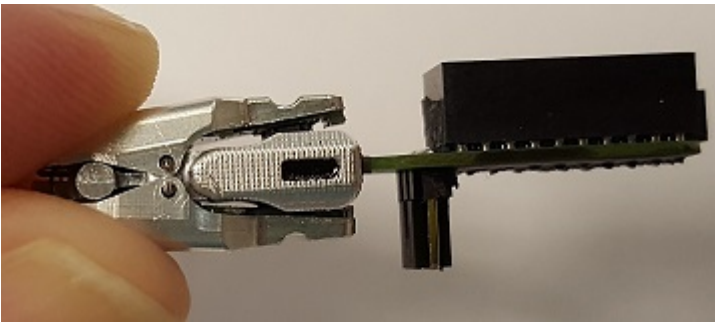


ZIF-Clip® Connection (ZD32 headstage and ZCA-NN32 adapter)

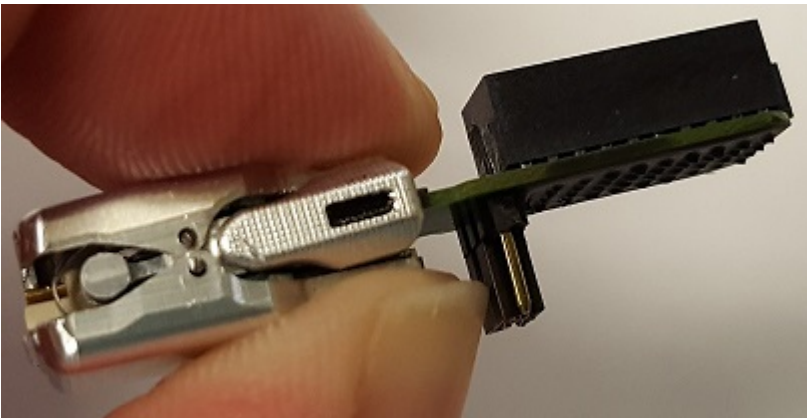
Connect probes and adapters to the headstage as described below.



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.



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.

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.

ZIF-Clip® Headstage O-Rings

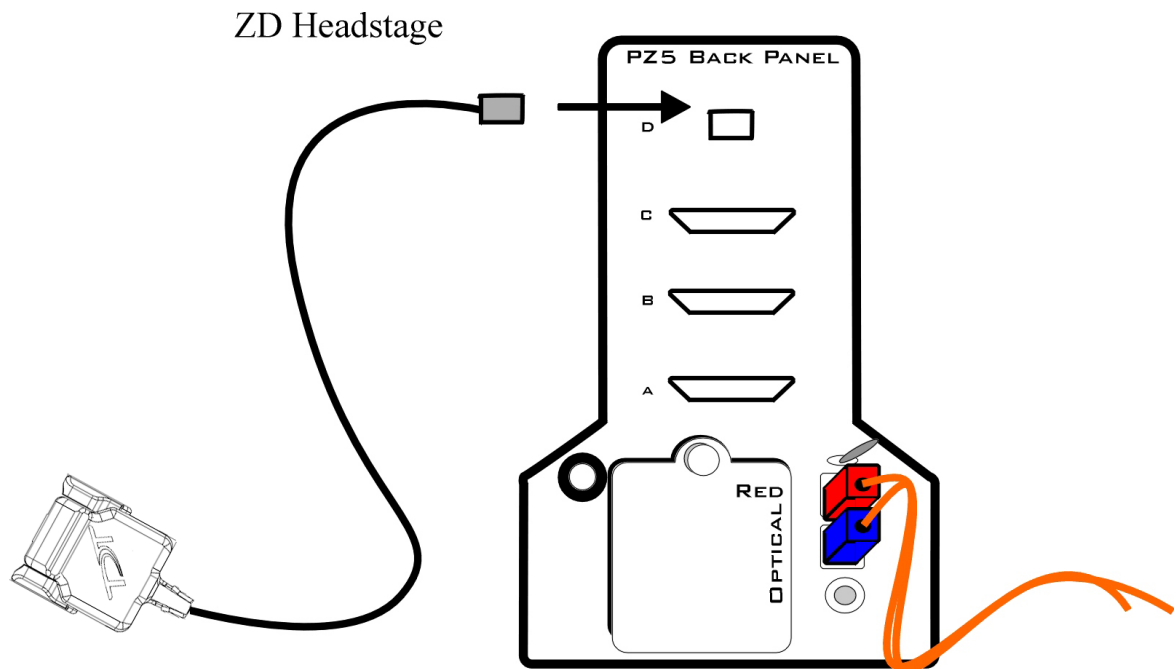
All ZIF-Clip® headstages are shipped with two o-rings for additional connection security. Gently slip the o-ring onto the headstage sleeve and then roll the o-ring towards the back of the headstage. Connect the probe or adapter to the headstage as described above. Once the connection is secure, roll 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/SIM 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 or SIM. The PZ5/SIM 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/SIM. See [PZ5 NeuroDigitizer](#) or [SIM Subject Interface](#) for more information.

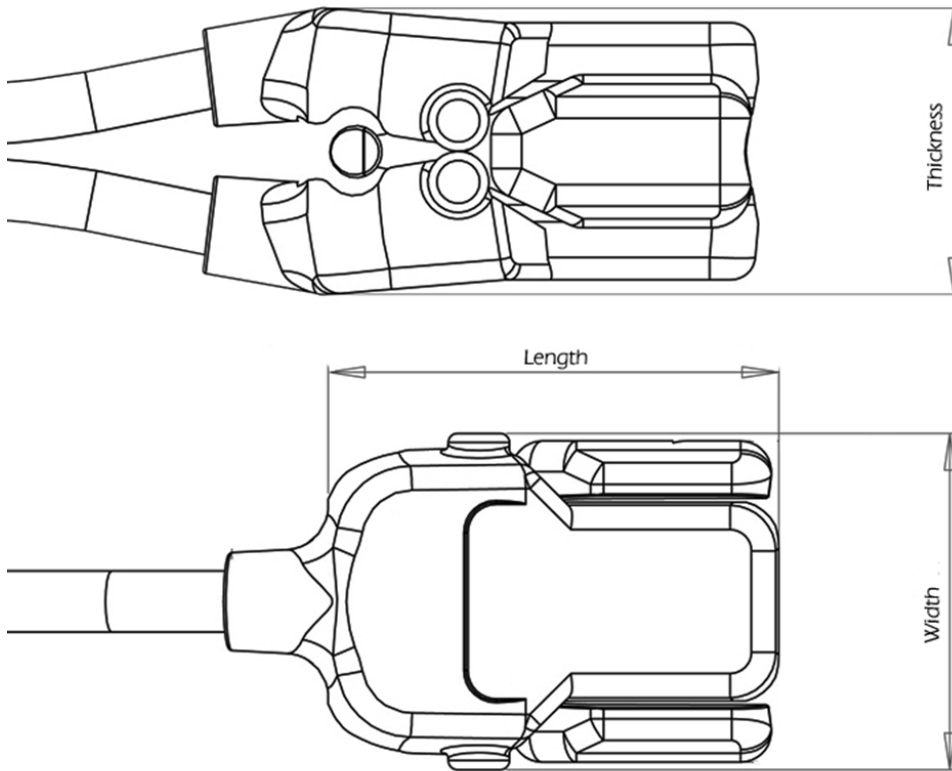


ZIF-Clip® ZD Digital Headstage to Preamplifier Connection Diagram

ZIF-Clip® Digital Headstage Technical Specifications

Input referred noise	2.4 μ Vrms typical. Varies slightly (<15%) with amplifier bandwidth
Input Impedance	1300 Mohm @ 10 Hz 13 Mohm @ 1 kHz TDT recommends using less than 2 Mohm electrodes
A/D	Up to 128 channels, 16-bit successive-approximation
A/D Sample Rate	Up to 24414.0625 Hz
Maximum Voltage In	\pm 5 mV
Frequency Response	3 dB: 0.1 Hz - 10 kHz
Anti-Aliasing Filter	3 rd order low-pass (-18 dB per octave)
Distortion (typical)	<0.8%

Dimensions



Headstage	Length Open	Length Closed	Width	Thickness Open	Thickness Closed	Mass
ZD32	16.107 mm	16.050 mm	10.500 mm	8.137 mm	7.400 mm	1.2 g
ZD64	16.446 mm	16.497 mm	15.500 mm	12.760 mm	10.400 mm	2.0 g
ZD96	17.469 mm	17.562 mm	19.000 mm	12.577 mm	10.499 mm	

Important

When using multiple headstages, ensure that a single ground is used for all headstages. This will avoid unnecessary noise contamination in recordings. See the [Headstage Connection Guide](#) for more information.

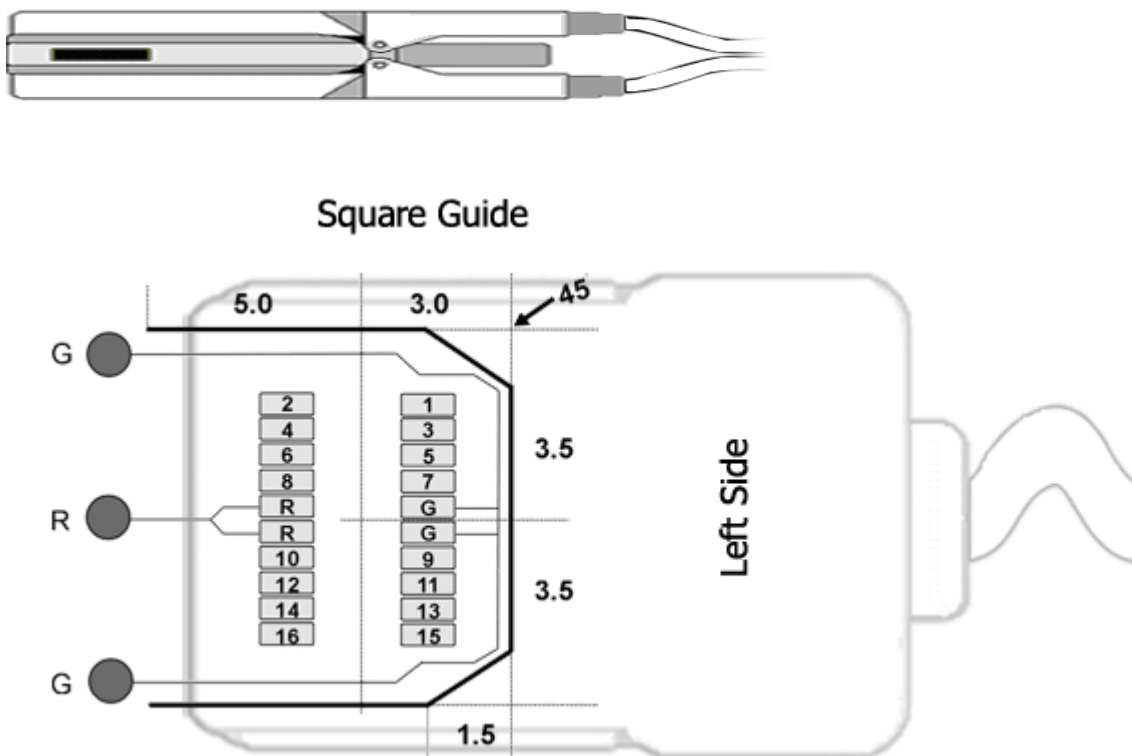
ZIF-Clip® Headstage Pinouts

If you are interested in using a third party electrode see [ZIF-Clip® Headstage Adapters](#). 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.

For Synapse users, use the [Channel Mapper gizmo](#) to reorder the channels according to the pinouts below. Choose TDT > HEADSTAGE > then the ZDn that matches your headstage.

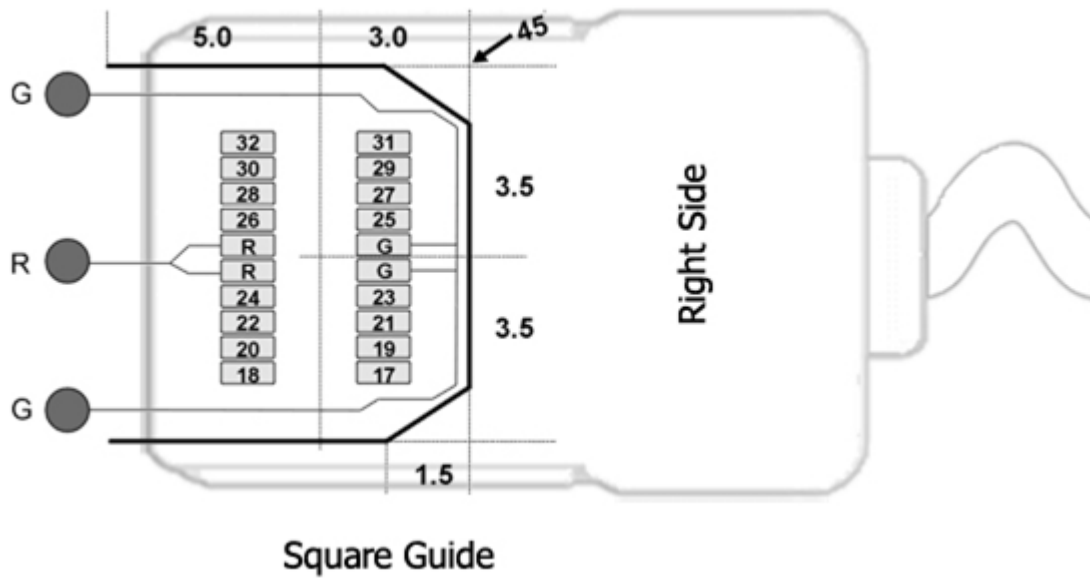
16- and 32-Channel Headstage Pinouts

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



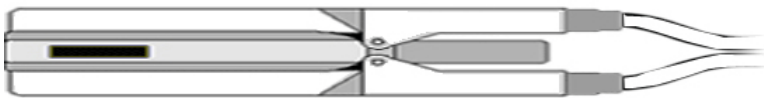
Hirose Connectors:

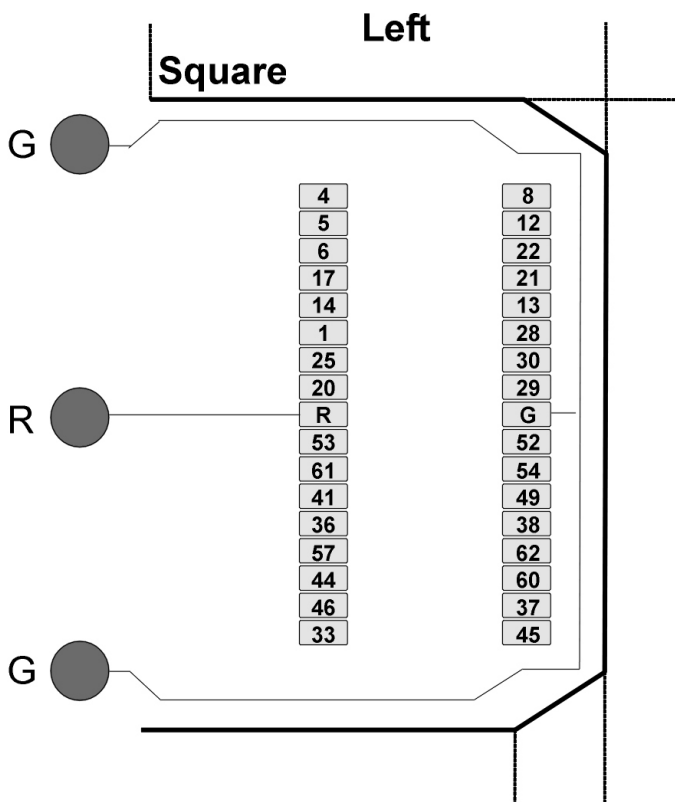
ZD16 - DF30FC-20DS-0.4V x 1

ZD32 - DF30FC-20DS-0.4V x 2

64-Channel Headstage Pinouts

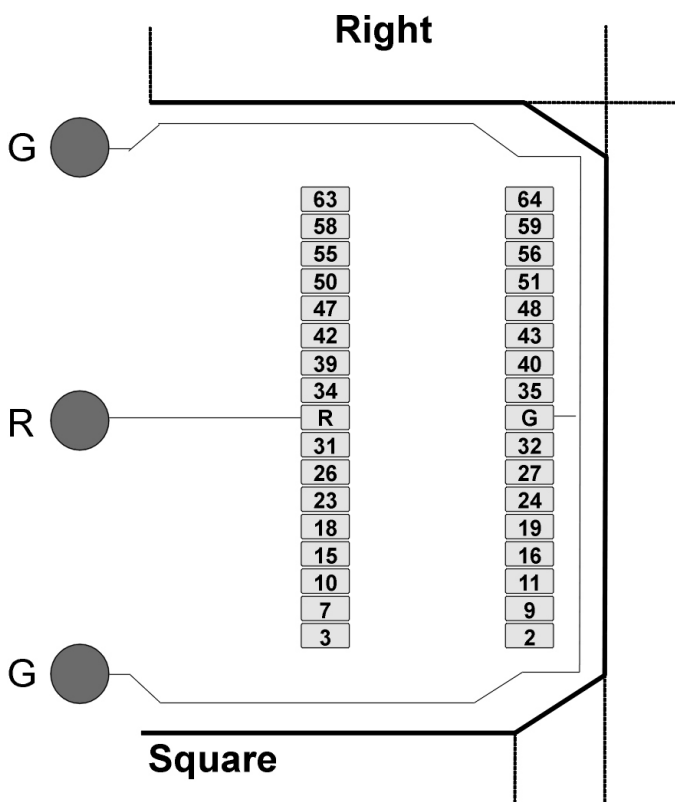
Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.





G Common/Ground Connection

R Reference Connection



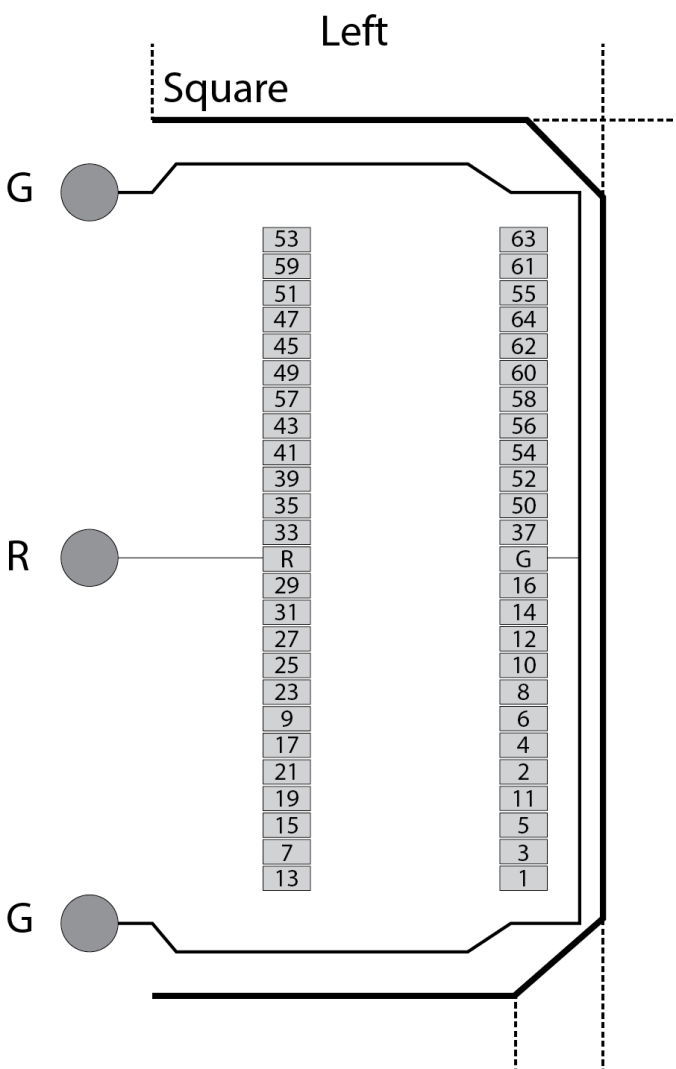
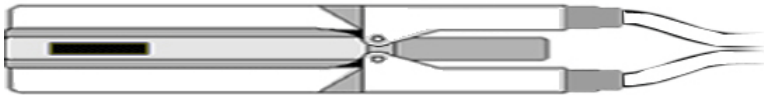
See Hirose specification for recommended footprint.

Hirose Connectors:

ZD64 - DF30FC-34DS-0.4V x 2

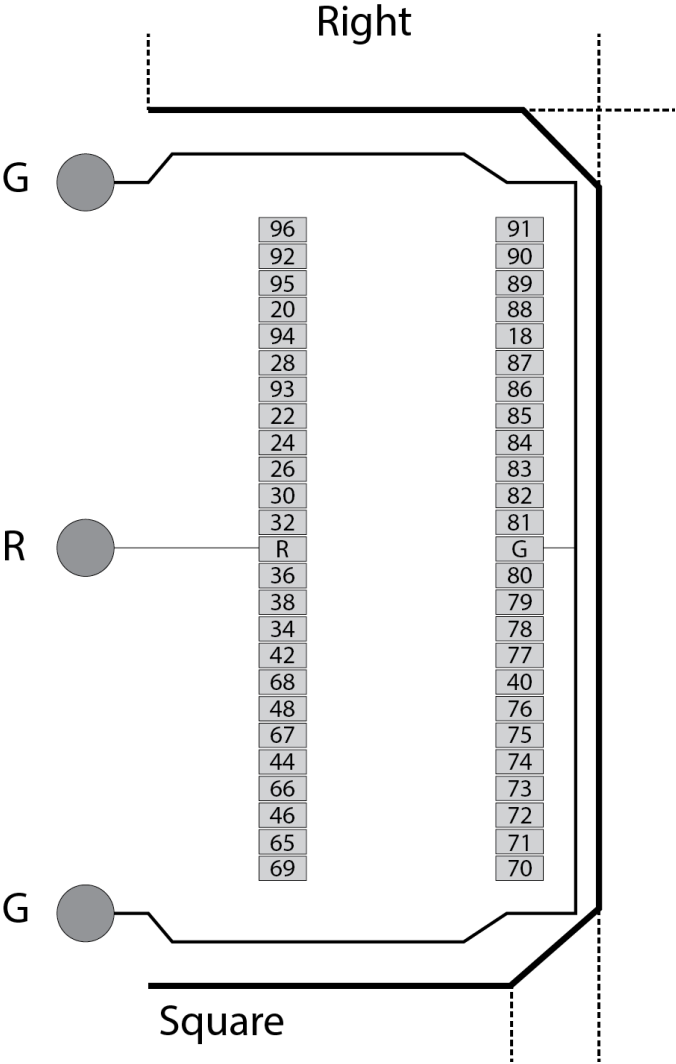
96-Channel Headstage Pinouts

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



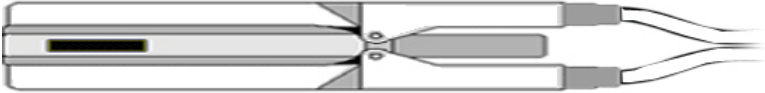
See Hirose specification for recommended footprint.

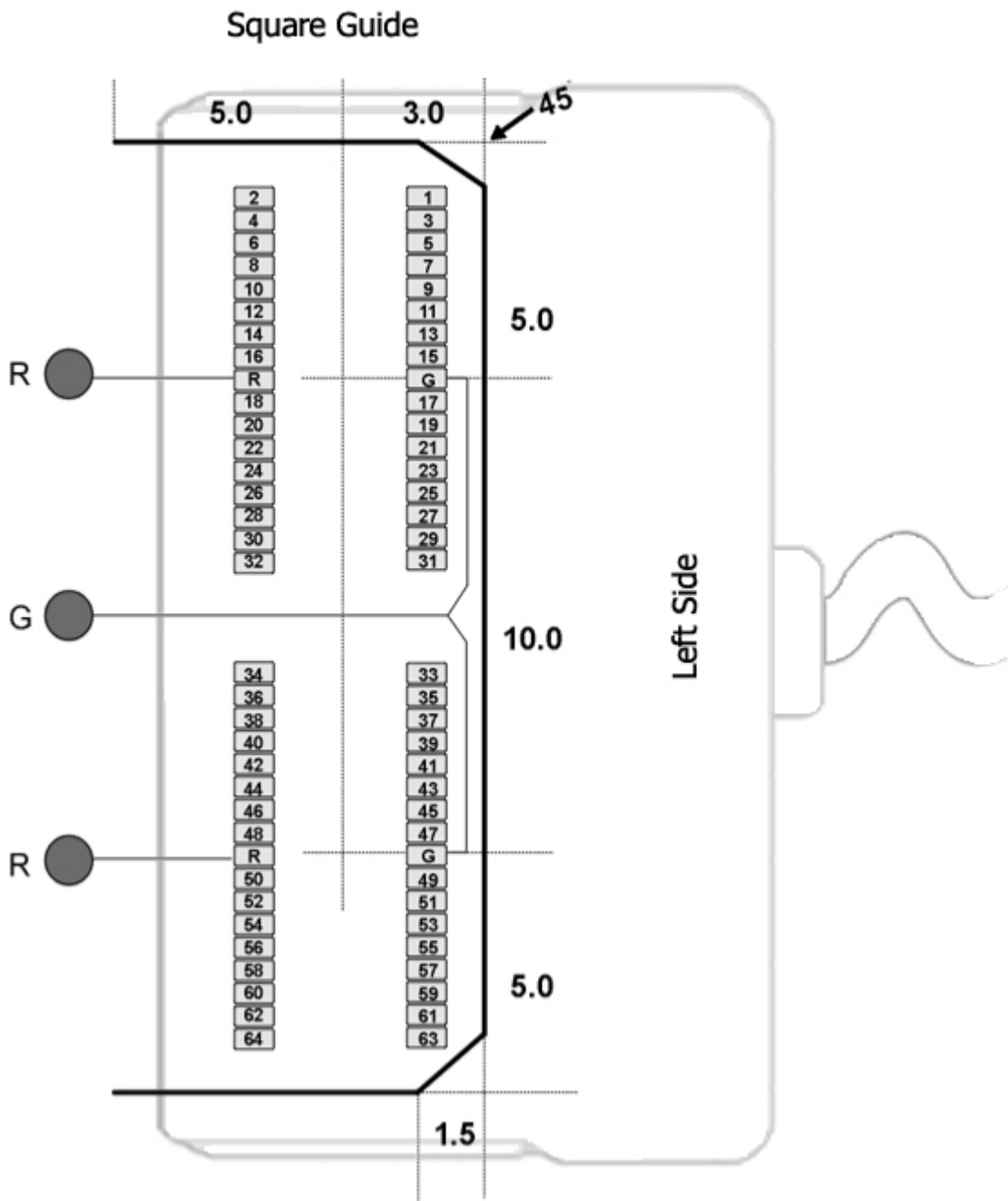
Hirose Connectors:

ZD96 - DF30FC-50DS-0.4V x 2

128-Channel Headstage Pinouts

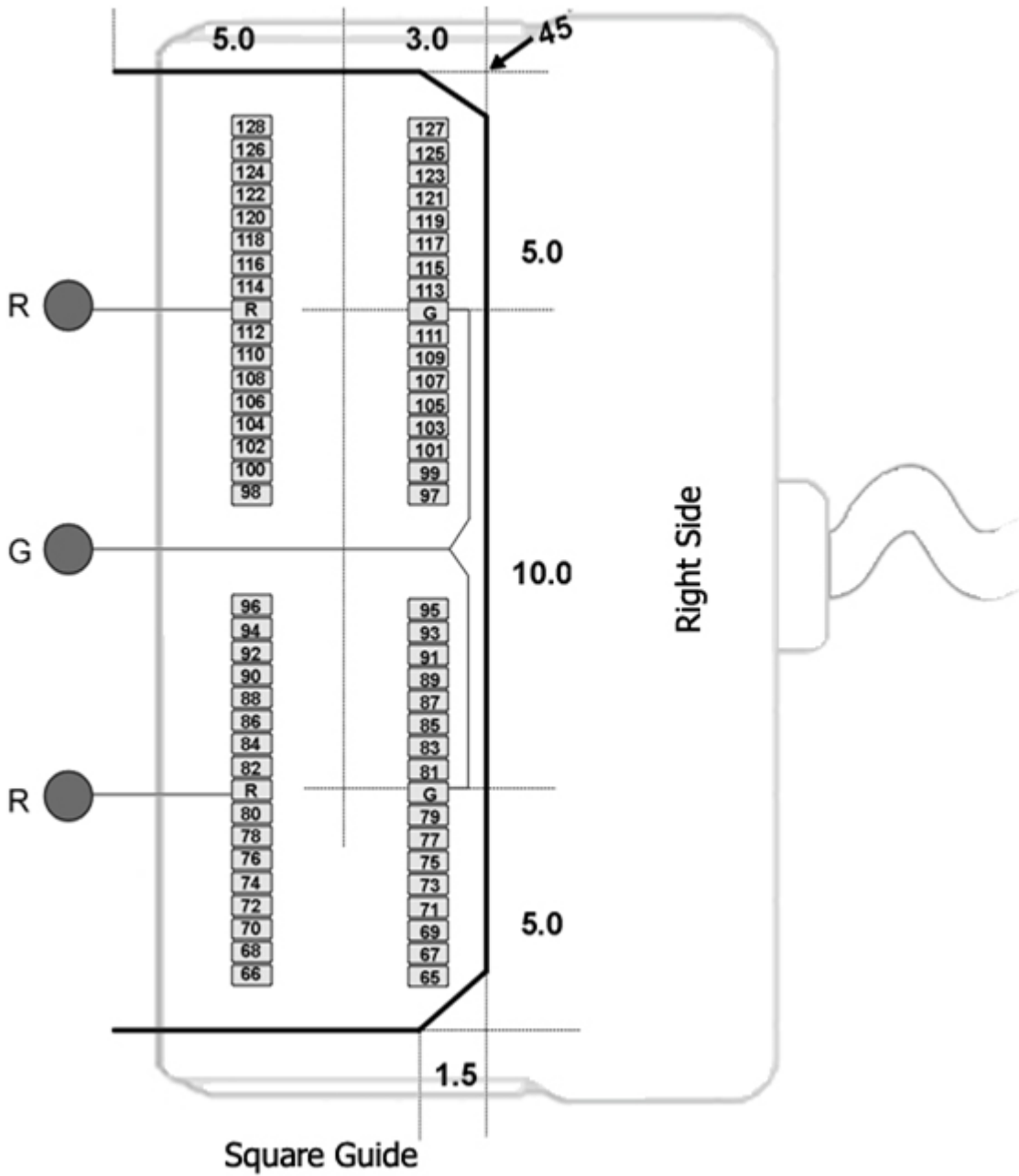
Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.





G Common/Ground Connection

R Reference Connection



See Hirose specification for recommended footprint.

Hirose Connectors:

ZD128 - DF30FC-34DS-0.4V x 4