ZIF-Clip® ZC Analog Headstages

Hardware Reference

Updated 2024-12-19

Tucker-Davis Technologies
11930 Research Circle
Alachua, FL 32615 USA
Phone: +1.386.462.9622
Fax: +1.386.462.5365

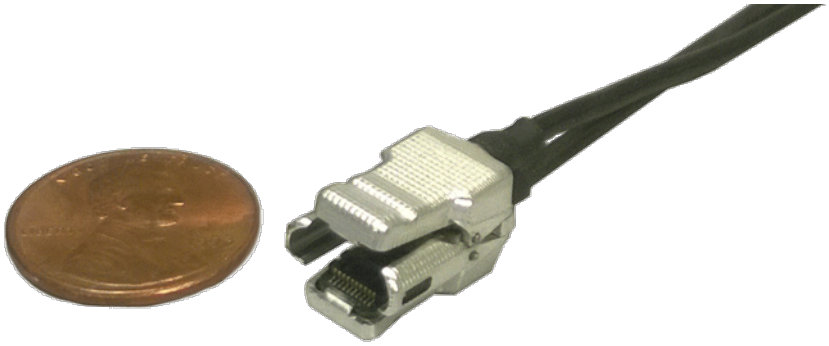
Notices

The information contained in this document is provided "as is," and is subject to being changed, without notice. TDT shall not be liable for errors or damages in connection with the furnishing, use, or performance of this document or of any information contained herein.

The latest versions of TDT documents are always online at https://www.tdt.com/docs/

Table of Contents

ZIF-Clip® ZC Analog Headstages



32-Channel ZIF-Clip® Headstage

ZIF-Clip® ZC Overview

ZIF-Clip® standard headstages are analog headstages recommended for use with probe impedance that range from 20 Kohm to 5 Mohm. They are designed to connect directly to a PZ preamplifier/neurodigitizer but may be connected to an RA16PA with the use of an adapter. Analog signal are buffered inside the headstage and digitized on the preamplifier/neurodigitizer for transfer to a base station processor, such as the RZ2 or RZ5D.

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.

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.

Part Numbers:

ZC16 - 16-channel Aluminum ZIF-Clip® headstage

ZC32 - 32-channel Aluminum ZIF-Clip® headstage

ZC64 - 64-channel Aluminum ZIF-Clip® headstage

ZC96 - 96-channel Aluminum ZIF-Clip® headstage

ZC128 - 128-channel Aluminum ZIF-Clip® headstage

ZIF-Clip® Passive Headstages

ZIF-Clip® passive headstages contain no active electronics. They provide passive cabling in 16, 32, 64, 96, 128 channel ZIF-Clip® form factors.

Part Numbers:

ZC16-P - 16 channel ZIF-Clip® passive headstage

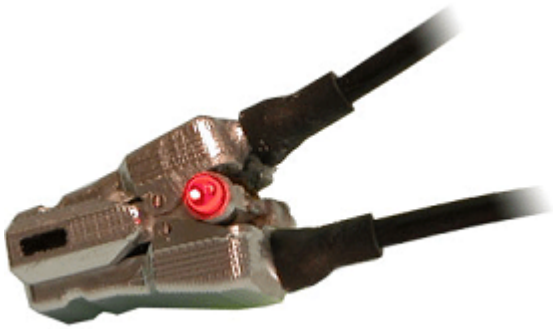
ZC32-P - 32 channel ZIF-Clip® passive headstage

ZC64-P - 64 channel ZIF-Clip® passive headstage

ZC96-P - 96 channel ZIF-Clip® passive headstage

ZC128-P - 128 Channel ZIF-Clip® passive headstage

ZIF-Clip® LED Headstages



ZIF-Clip® LED headstages have built-in red and green LEDs on each side. The LEDs provide an ample amount of light for tracking test subjects and are available for 16, 32 and 64-channel ZIF-Clip® standard headstages.

> **Note**
>
> ZIF-Clip® headstage LEDs cannot be added to existing non-LED headstages.

Part Numbers:

ZC16-LED - 16-channel ZIF-Clip® headstage with LEDs

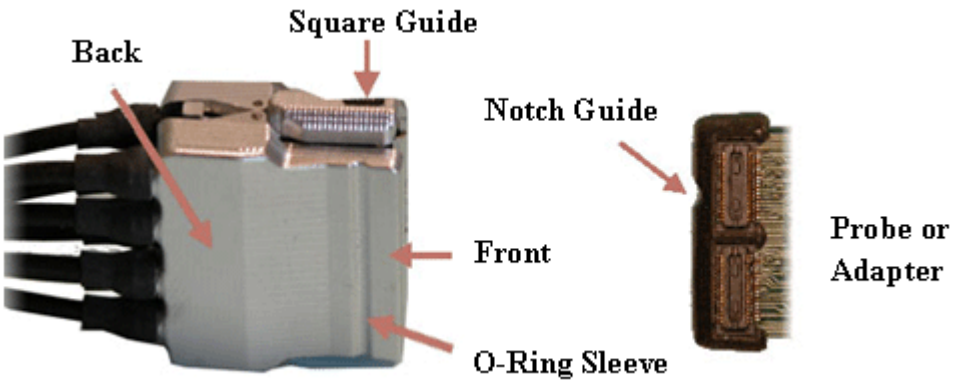
ZC32-LED - 32-channel ZIF-Clip® headstage with LEDs

ZC64-LED - 64-channel ZIF-Clip® headstage with LEDs

Adapter and Probe Connection

> **Warning**
>
> The headstage has sensitive electronics. Always ground yourself before handling.

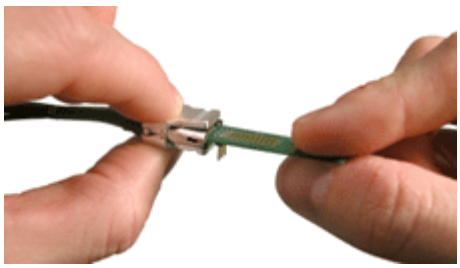
ZIF-Clip® headstages are designed to automatically position the high density connectors on the headstage and probe (or adapter).



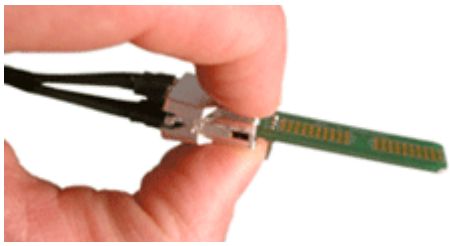
Standard ZIF-Clip® Headstage

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.

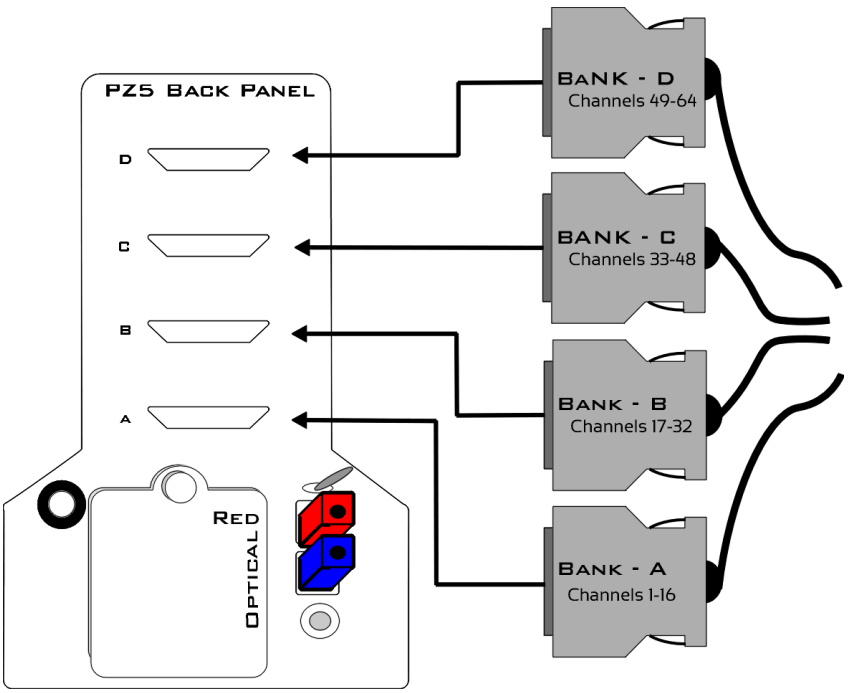
ZIF-Clip® Headstage O-Rings

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® Headstages to Amplifier Connection

One or more MiniDB26 connectors are used to connect the ZIF-Clip® standard headstage to a PZ5 or Subject Interface depending on the number of channels in the headstage. Each MiniDB26 connector carries 16 channels and is labeled with a bank letter that corresponds to its matching bank on the preamplifier. For example the MiniDB26 connector labeled "Bank A" should connect to bank A on the PZ5 or Subject Interface bank 1 and will carry channels 1-16. Subsequently, "Bank B" corresponds to the next 16 channels of the headstage, etc. See PZ5 NeuroDigitizer or SIM Subject Interface for more information.



Headstages to PZ5 Connection

Headstage Voltage Range

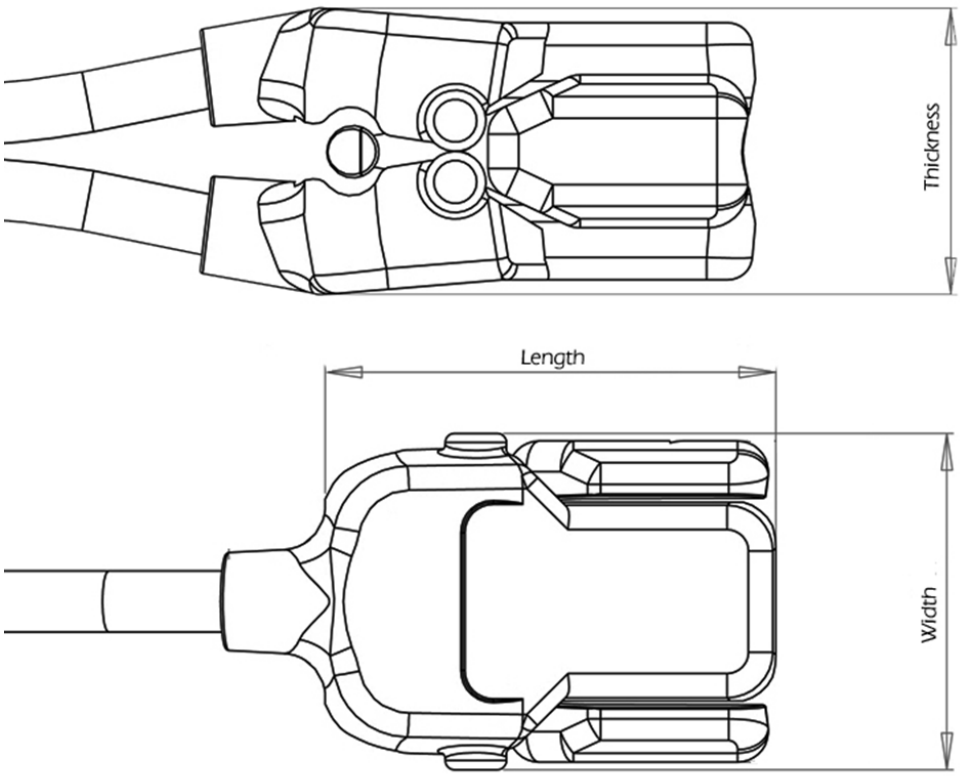
When using a TDT preamplifier the voltage input range of the preamplifier (PZ5, Subject Interface, RA16PA) is typically lower than the headstage and must be considered the effective range of the system. Also keep in mind that the output range of the headstage varies depending on the power supply provided by the preamplifier. PZ5 and Subject Interface supply ±2.5 V. PZ2 and RA16PA preamplifiers supply ±1.5 V. Third party preamplifiers may vary. TDT recommends using preamplifiers which deliver ±2.5 V or less. The table below lists the input voltage ranges for the ZIF-Clip® standard headstage for either ±1.5 V or ±2.5 V power sources.

Power Source	Headstage Input Range
±1.5 V	±1.48 V
±2.5 V	±2.49 V

ZIF-Clip® ZC Headstages Technical Specifications

Input referred noise	3 uVrms bandwidth 300-3000 Hz 6 uVrms bandwidth 30-8000 Hz
Headstage Gain	Unity (1x)
Frequency Response	DC - 25 kHz
Input Impedance	1e14 ohms

Dimensions



Headstage	Length Open	Length Closed	Width	Thickness Open	Thickness Closed	Mass
ZC16/ZC32*	14.401 mm	14.300 mm	10.500 mm	10.255 mm	10.051 mm	2.6 g
ZC64	16.461 mm	16.400 mm	15.500 mm	10.328 mm	10.051 mm	4.8 g
ZC96	17.452 mm	17.400 mm	19.000 mm	10.015 mm	10.051 mm	6.5 g
ZC128	17.948 mm	17.900 mm	25.500 mm	10.212 mm	10.051 mm	9.9 g

* Form factor for both the ZC16 and ZC32 is the same.

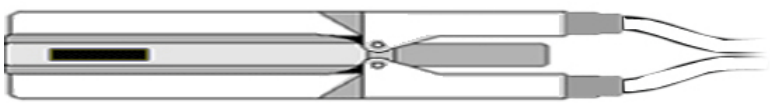
> **Important**
>
> When using multiple headstages, ensure that a single ground is used for all headstages. This will avoid unnecessary noise contamination in recordings. See the Headstage Connection Guide for more information.

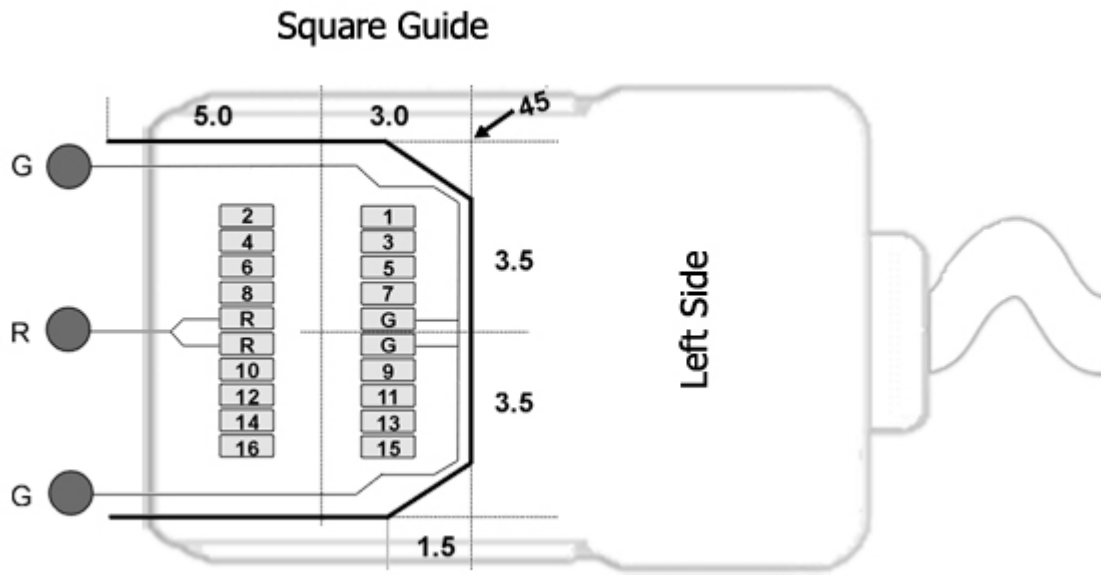
ZIF-Clip® Headstage Pinouts

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.

16- and 32-Channel Headstage Pinouts

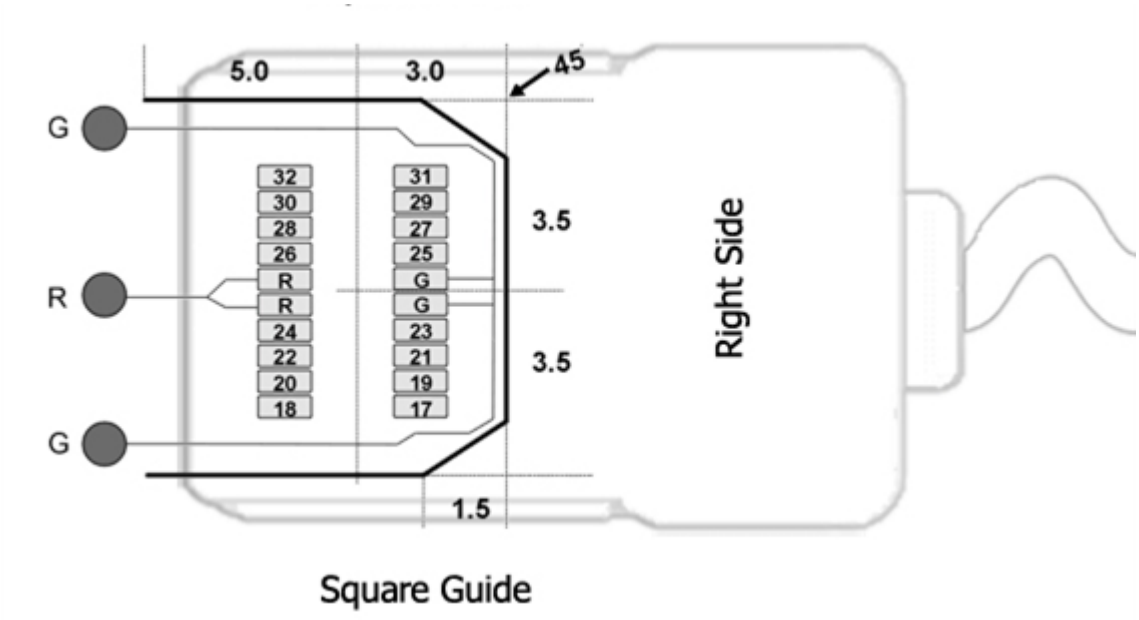
Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.





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.

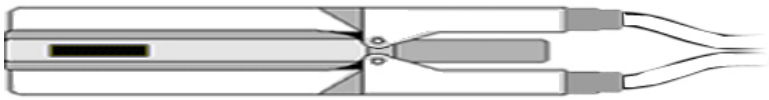
Hirose Connectors:

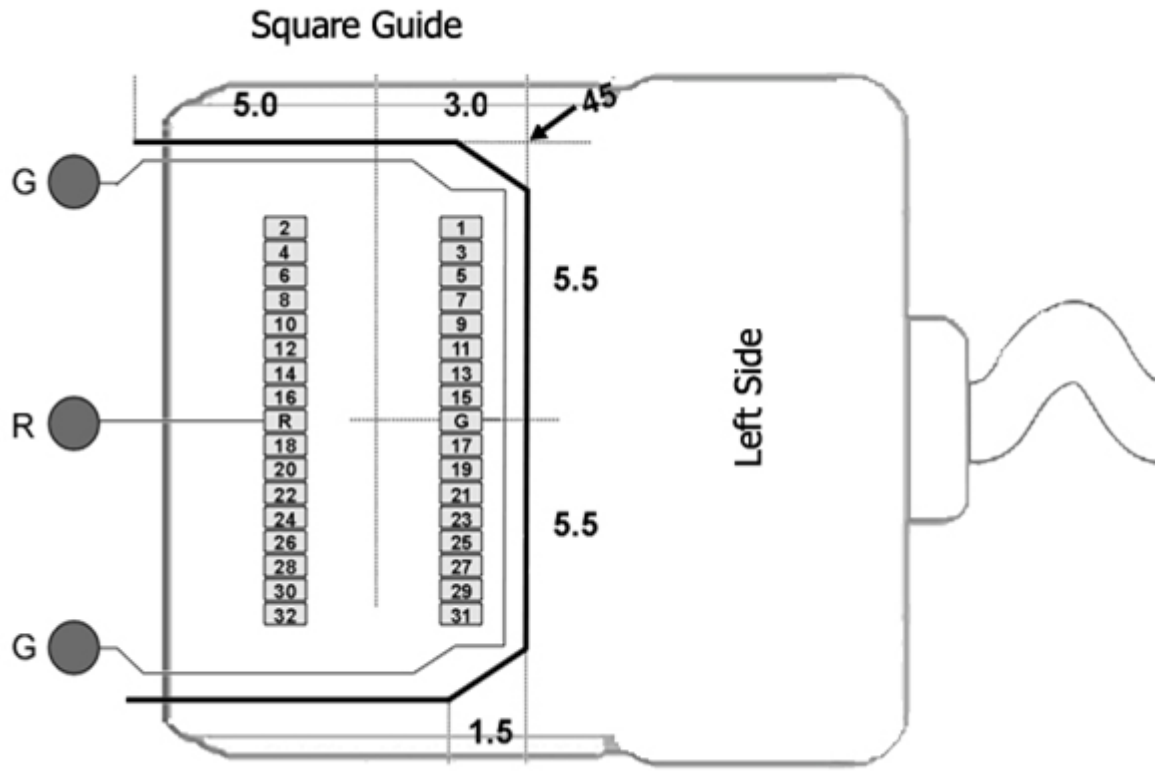
ZC16 - DF30FC-20DS-0.4V x 1

ZC32 - DF30FC-20DS-0.4V x 2

64-Channel Headstage Pinouts

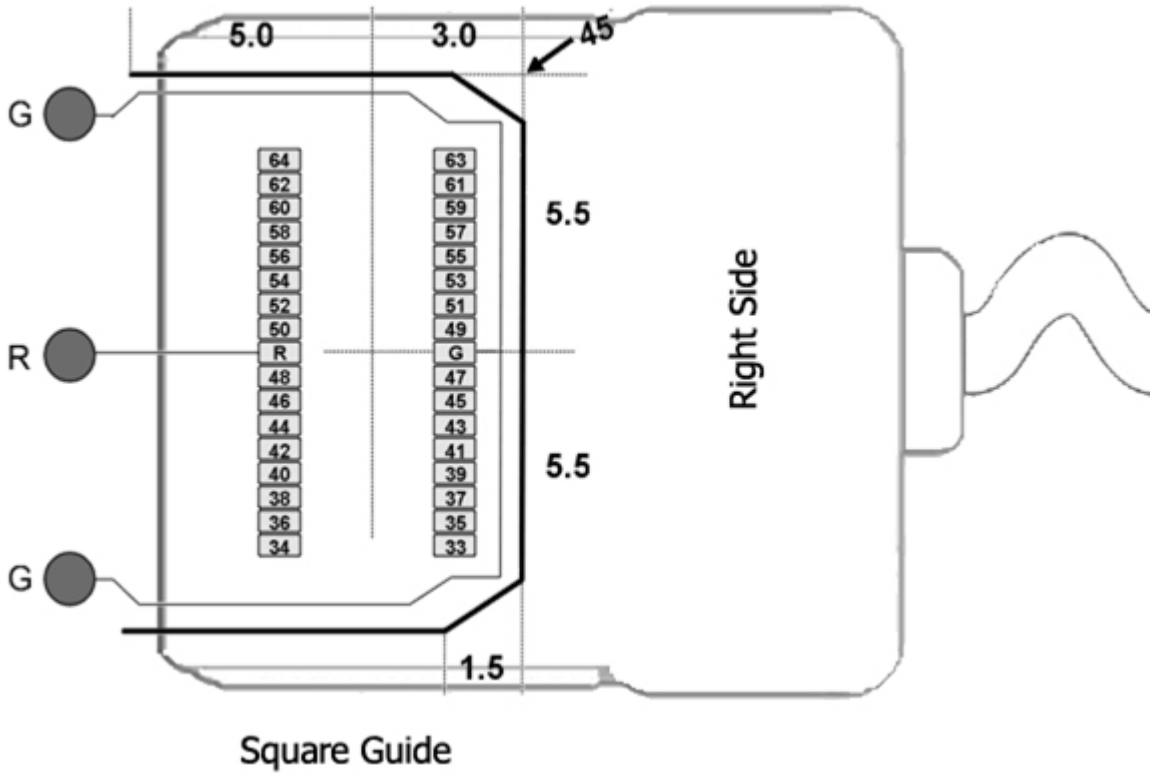
Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.





G Common/Ground Connection

R Reference Connection



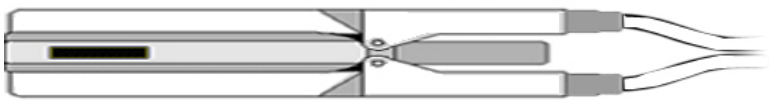
See Hirose specification for recommended footprint.

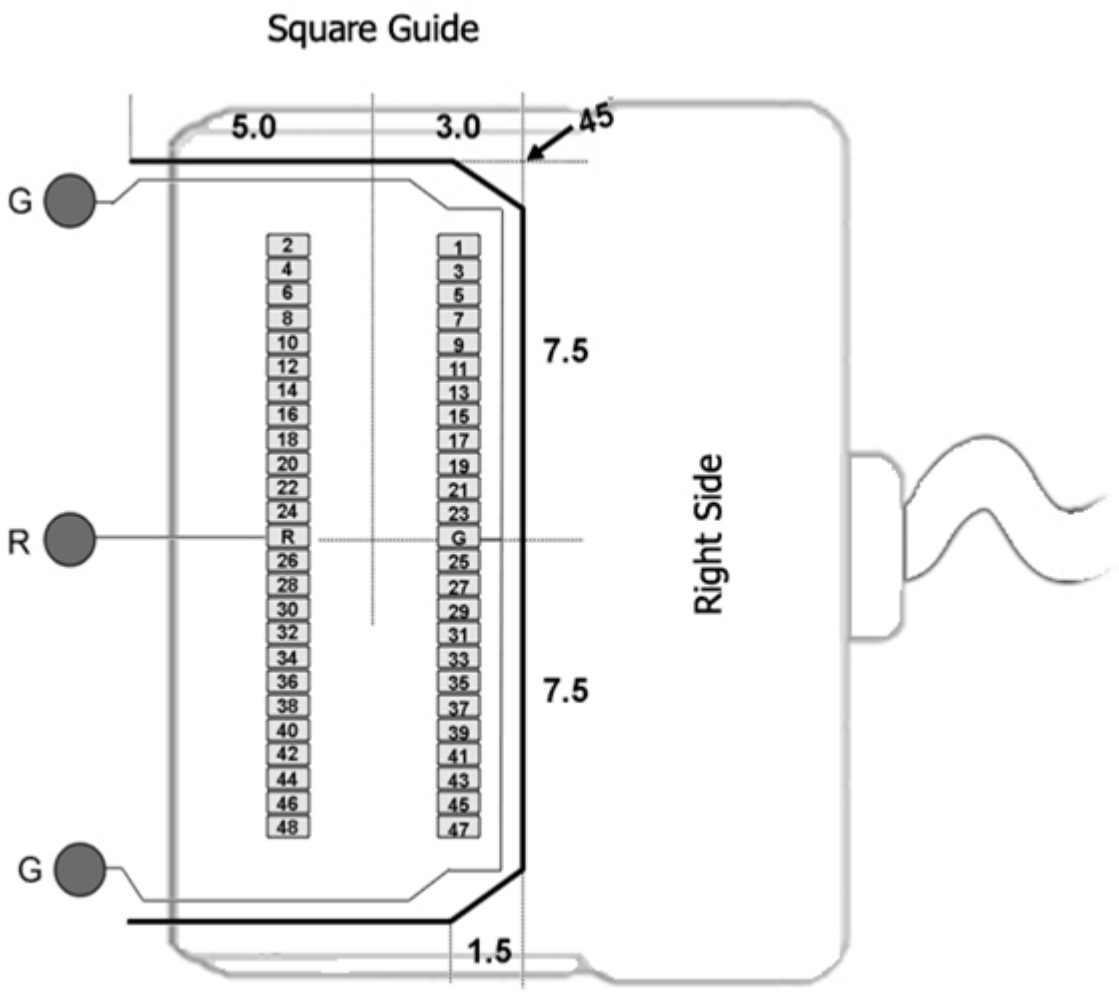
Hirose Connectors:

ZC64 - DF30FC-34DS-0.4V x 2

96-Channel Headstage Pinouts

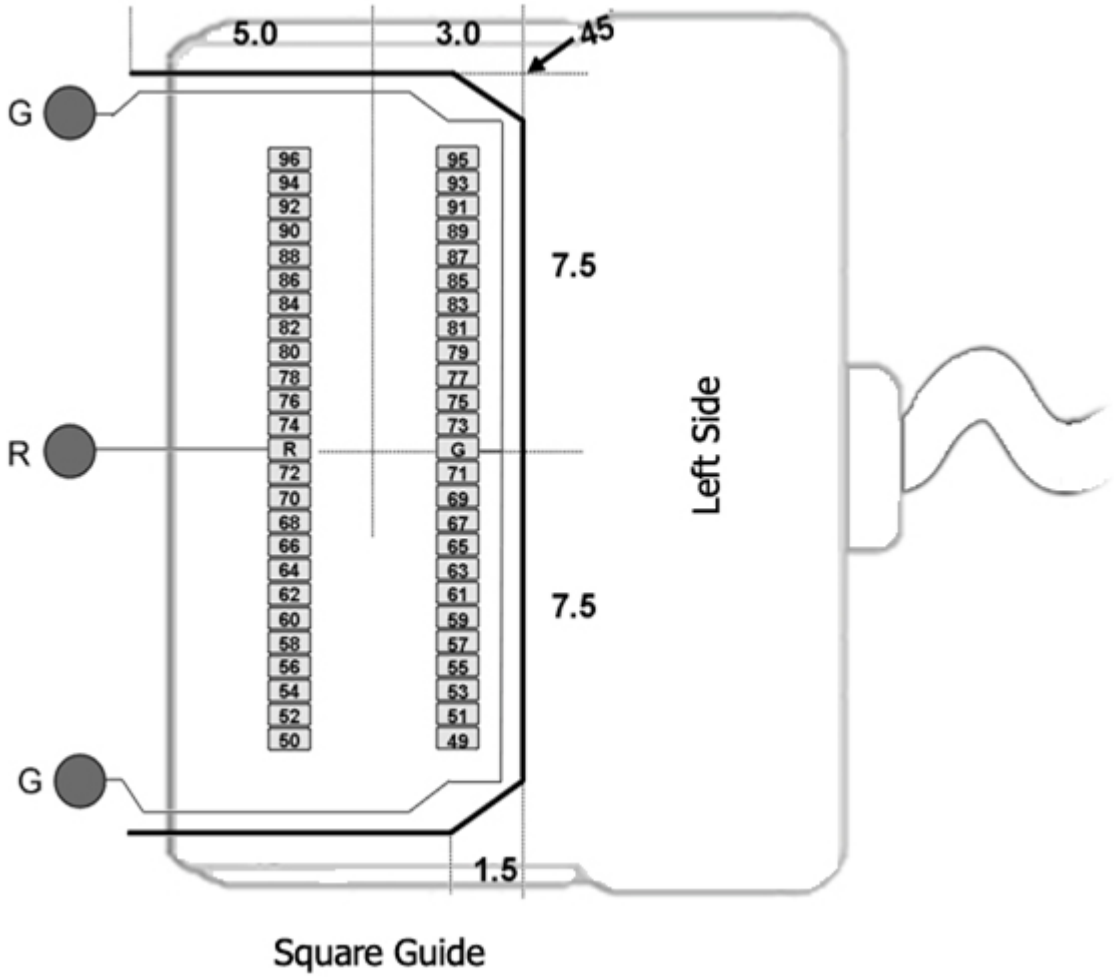
Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.





G Common/Ground Connection

R Reference Connection



Square Guide

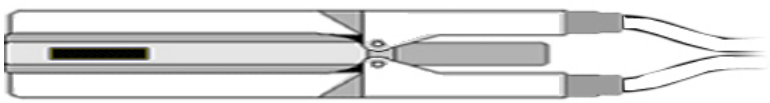
See Hirose specification for recommended footprint.

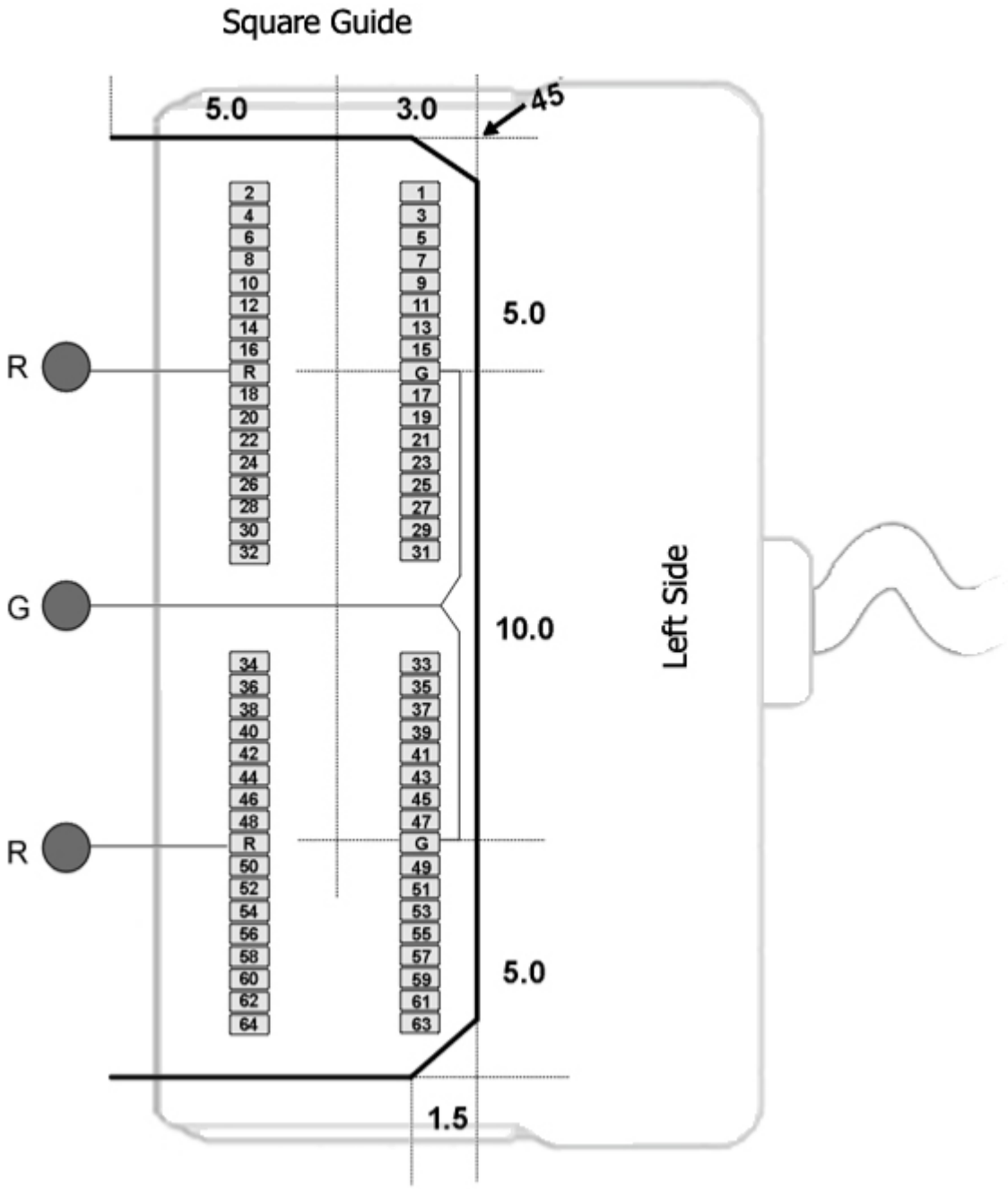
Hirose Connectors:

ZC96 - DF30FC-50DS-0.4V x 2

128-Channel Headstage Pinouts

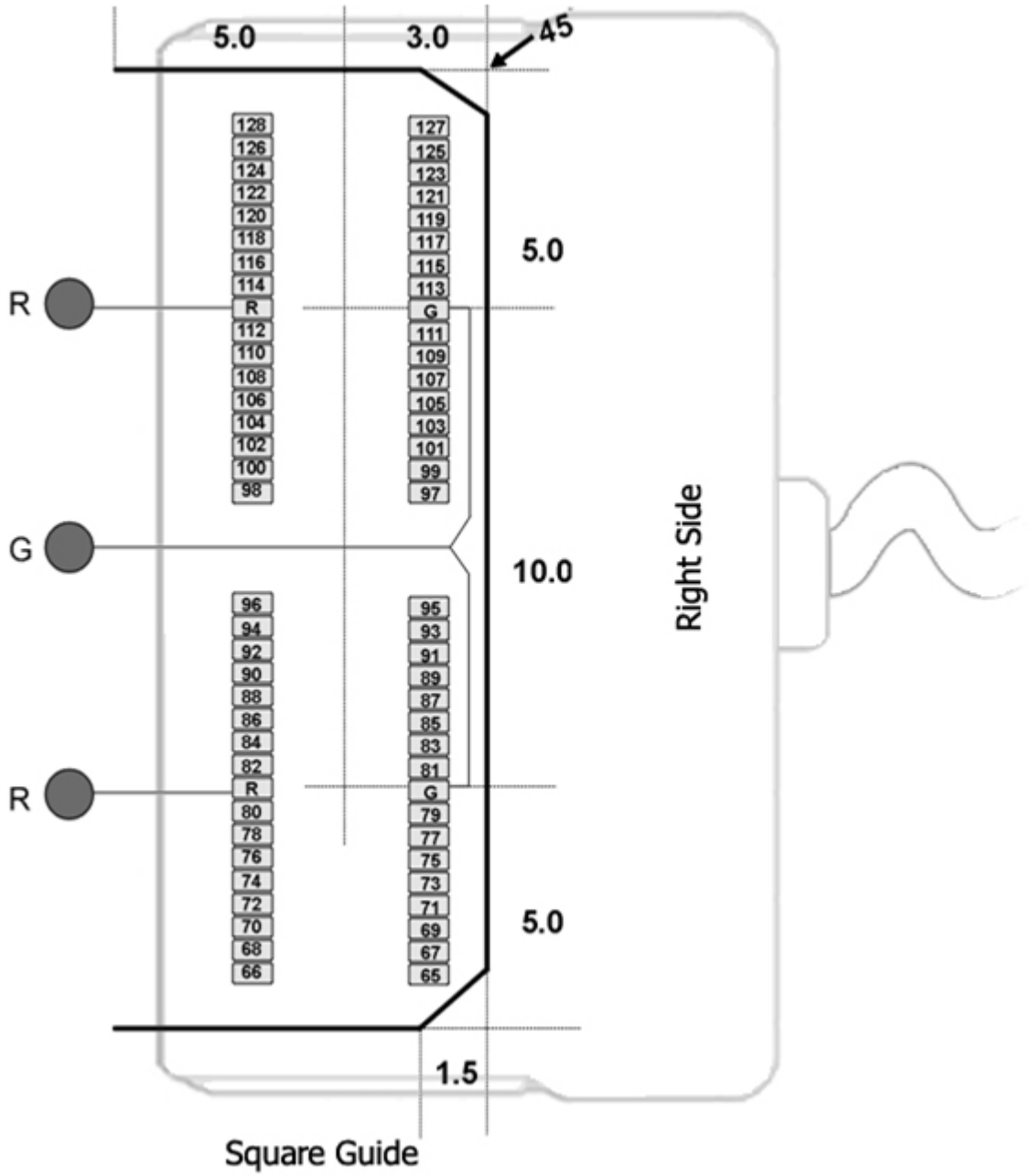
Images are not to scale. Pinouts are looking through the headstage shell (or into a matching board connector). All board dimensions are in millimeters and are identical for both sides, board thickness is 0.75 mm, and connectors are centered as shown.





G Common/Ground Connection

R Reference Connection



See Hirose specification for recommended footprint.

Hirose Connectors:

ZC128 - DF30FC-34DS-0.4V x 4