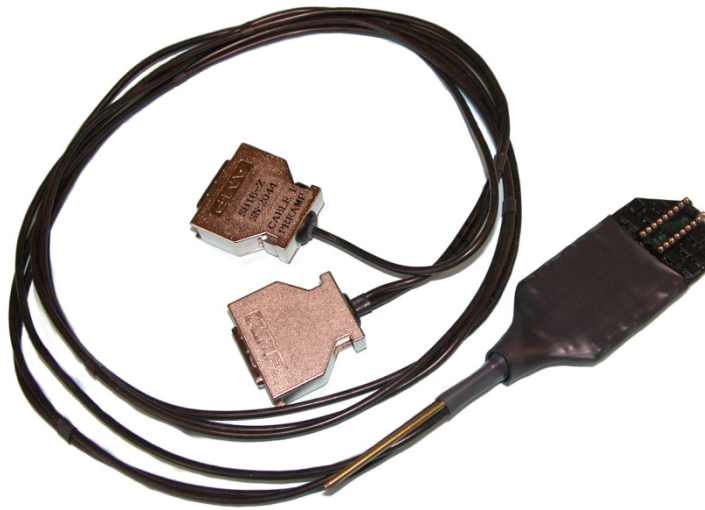


SH16-IZ - 16 Channel Switchable Acute Headstage



SH16-IZ Overview

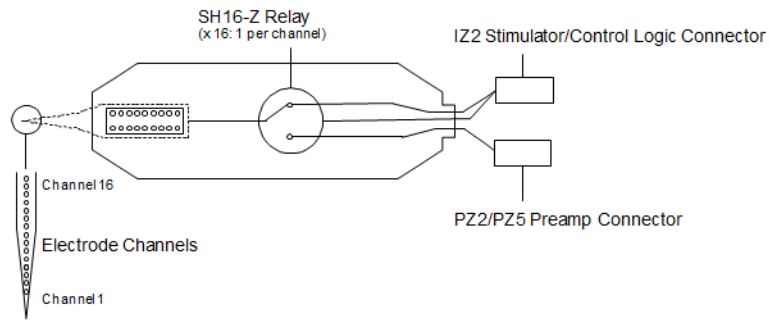
The SH16-IZ is a 16 channel acute headstage containing programmable relays that connect selected channels to the IZ2 stimulator and leave unselected channels connected to the PZ2. It features high voltage, low leakage solid-state relays to allow for remote switching.

Note: The SH16-IZ switching headstage provides unity gain (1x) for its recording channels.

Channel selection is handled within the IZ2_Control macro which generates a 24-bit serial control bit pattern to control SH16-Z channel switching. The minimum switching time is dependent on the length of time it takes to receive the control bit pattern plus an inherent 2 ms delay associated with the solid state relay switches. Typical switching times are shown in the table below.

| Sampling Rate | Minimum SH16-Z Switching Time (ms) |
|------------------|------------------------------------|
| 50 kHz and above | 28 |
| 25 kHz | 53 |

The diagram below illustrates how the relays are used to switch channels for recording (to PZ2) or stimulation (from IZ2).



Switchable Headstage Diagram

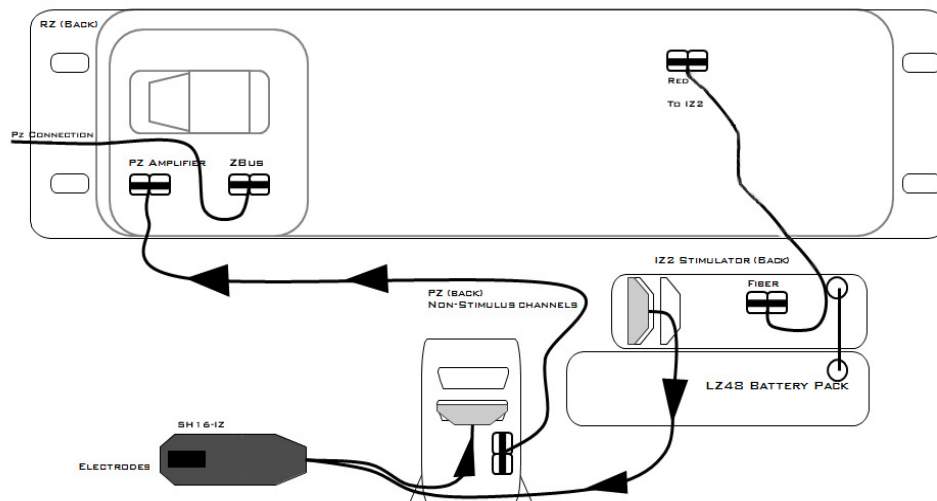
The 16 channel switchable acute headstage has an 18-pin DIP connector that can be used with standard high impedance metal electrodes. The pinout of the SH16-IZ matches the wiring of NeuroNexus electrodes, allowing direct connection to the headstage. TDT recommends connecting electrodes to an 18-pin DIP socket and then connecting the socket to the headstage to protect the headstage from unnecessary wear and tear.

Important!

When using the headstage with the NeuroNexus probes, keep in mind that there may be several versions of the probe. Check the NeuroNexus Website for pin diagrams. Also, see MCMAP for a description and examples on how to re-map channel numbers.

Connection Diagram

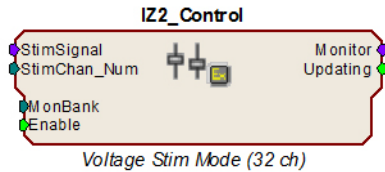
When using the SH16-IZ with a microstimulator system, connect the system as shown. The diagram below shows a system configuration featuring the RZ Processor, an IZ2 Stimulator, and PZ2 preamp or PZ5 digitizer. The IZ2 connects to the front panel of an RZ5D and the back panel of all other RZ devices.



SH16-IZ to MicroStimulator Connection Diagram

Switchable Headstage Operation

When using the SH16-IZ switching headstage it should be enabled in the IZ2_Control macro.



The StimChan parameter input is used to set the stimulation channels. Based on the macro settings, you either specify a single channel to open for stimulation or send a channel mask if stimulating on more than one channel. All necessary control signals are sent from the base station to the headstage via the IZ2 output port. To use an electrode as the stimulus return path, make sure that channel is open for stimulation and send an inverted stimulus signal to that channel.

Multiple SH16-IZs can be used with a single IZ2. The MonBank input determines which SH16-IZ is updated when the StimChan value is changed.

See the Help text in the IZ2_Control macro's properties dialog boxes for more information about this macro.

Note: The SH16-IZ Headstage requires at least 10 ms to initialize its control bits for use. If you are trying to trigger the enable input you must either use a trigger signal that is delayed 10 ms from the point the circuit is run or use a manual trigger method to begin acquisition.

Technical Specifications

| | |
|------------------------|------------|
| Headstage Gain | Unity (1x) |
| Input Impedance | 1014 Ohms |

SH16-IZ Pinout Diagrams

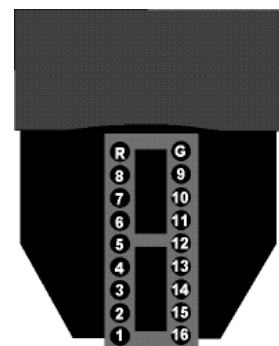
Headstage Pinout

The numbers in the diagram to the right refer to the channel connections to the preamp connector or stimulator connector.

“G” on the diagram to the right is connected to the ground pin (GND) on the stimulator connector and can also connect to the ground pin (GND) of the preamp connector through a switchable relay in the SH16-IZ.

“R” on the diagram to the right is connected to a switchable relay that can connect to the “Ref” pin of the preamp connector.

The electrode connector accepts 0.5 mm diameter male pins.

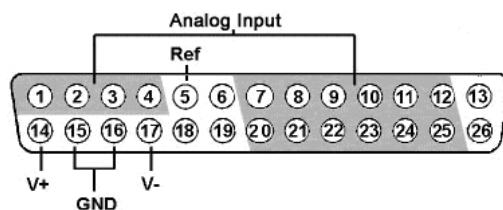




The headstage has sensitive electronics. Always ground yourself before handling.

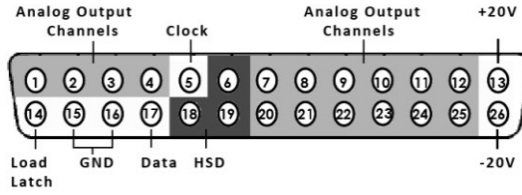
PreAmp Connector

For SH16-IZ headstages, this connector does not need to be connected if the user is not recording on the non-stimulating channels.



| Pin | Name | Description | Pin | Name | Description |
|-----|------|--|-----|------|---|
| 1 | A1 | Analog Input Channel Number Ch 1-4 | 14 | V+ | Positive Voltage |
| 2 | A2 | | 15 | GND | Ground |
| 3 | A3 | | 16 | GND | Ground |
| 4 | A4 | | 17 | V- | Negative Voltage |
| 5 | REF | Reference Pin | 18 | NA | Not Used |
| 6 | NA | Not Used | 19 | NA | Not Used |
| 7 | A5 | Analog Input Channel Number Ch 5, 7, 9, 11, 13, and 15 | 20 | A6 | Analog Input Channel Number Ch 6, 8, 10, 12, 14, and 16 |
| 8 | A7 | | 21 | A8 | |
| 9 | A9 | | 22 | A10 | |
| 10 | A11 | | 23 | A12 | |
| 11 | A13 | | 24 | A14 | |
| 12 | A15 | | 25 | A16 | |
| 13 | NA | Not Used | 26 | NA | Not Used |

DB26 Stimulator Connector



| Pin | Name | Description | Pin | Name | Description |
|-----|-------|--|-----|------|---|
| 1 | S1 | Stimulator Channels Ch 1-4 | 14 | LL | Load/Latch |
| 2 | S2 | | 15 | GND | Ground |
| 3 | S3 | | 16 | GND | Ground |
| 4 | S4 | | 17 | Data | Digital Data |
| 5 | Clock | Digital Clock | 18 | HSD | Stimulator Detect |
| 6 | HSD | Stimulator Detect | 19 | HSD | Stimulator Detect |
| 7 | S5 | Stimulator Channels Ch 5, 7, 9, 11, 13, and 15 | 20 | S6 | Stimulator Channels Ch 6, 8, 10, 12, 14, and 16 |
| 8 | S7 | | 21 | S8 | |
| 9 | S9 | | 22 | S10 | |
| 10 | S11 | | 23 | S12 | |
| 11 | S13 | | 24 | S14 | |
| 12 | S15 | | 25 | S16 | |
| 13 | +20V | +20V | 26 | -20V | -20V |

