

# PZ4 Digital Headstage Manifold



## PZ4 Overview

The PZ4 is a high channel count manifold for transmitting extracellular recordings acquired with TDT's ZCD digital headstages to an RZ base station for processing.

This device supports sampling rates up to ~25 kHz. The PZ4 manifold is available with 1, 2 or 4 digital headstage connections for a variety of channel counts.

The PZ4-4 has four DB26 connections and can support up to 256 channels. The PZ4-2 has two DB26 connections and can support up to 128 channels. The PZ4-1 has a single DB26 connection and can support up to 32 channels.

## PZ4 System Hardware

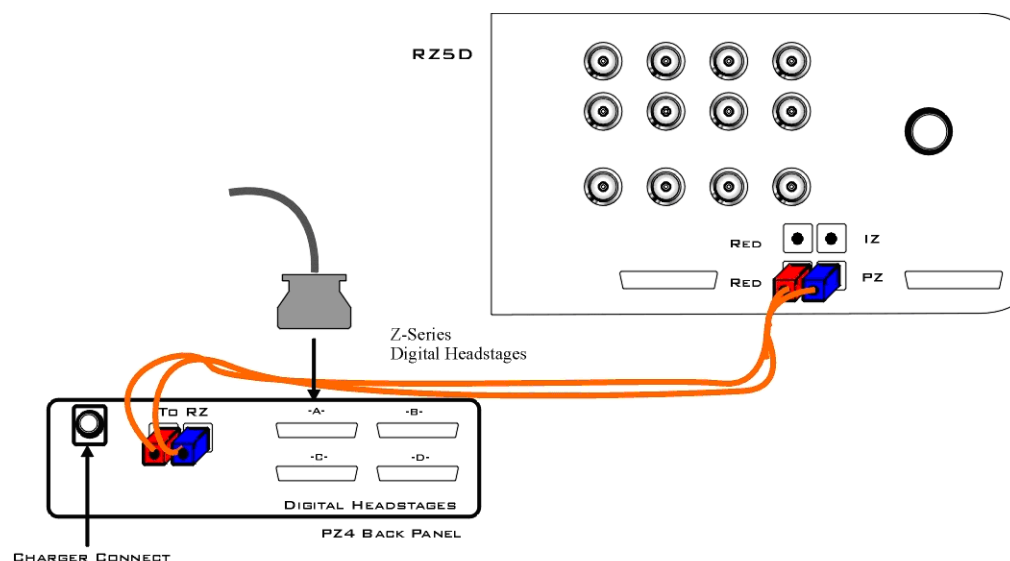
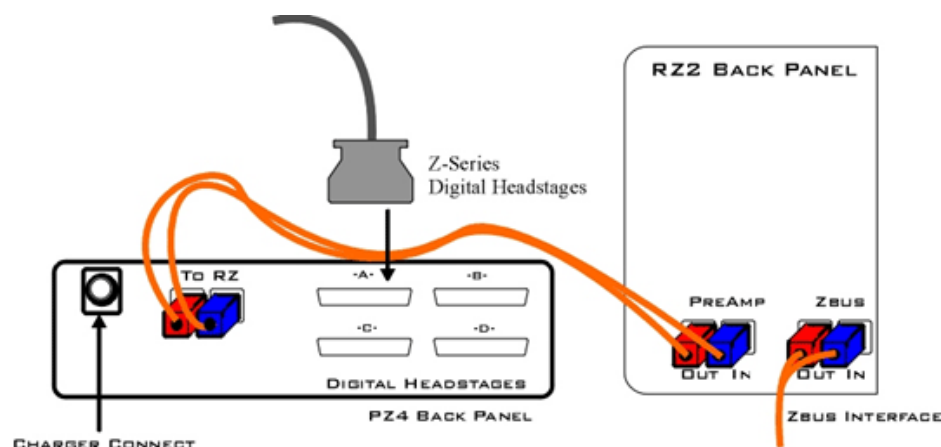
Analog signals from the electrodes are digitized on the ZCD headstage and transmitted to the PZ4. They are then organized and streamed to the RZ base station over a fiber optic connection for further processing and data storage.

The PZ4 Manifold has up to four 26-pin headstage connectors (DB26) on the back of the unit. Because the PZ4 accepts digital inputs, the channel count for each DB26 connection is not fixed. Each DB26 connection can support any headstage channel count up to the limit for the entire PZ4 device. For example, the DB26 port on a PZ4-1 can accept either a 16 channel (ZCD-16) or 32 channel headstage (ZCD-32). A PZ4-2 might have a 32ch headstage (ZCD-32) connected to Bank A and a 96 channel headstage (ZCD-96) connected to Bank B for a total of 128 channels.

The PZ4 will automatically detect the number of channels in the headstage on each DB26. All channels will be concatenated together, starting with connector "-A-", to create the output signal to the RZ base station.

## Hardware Set-up

The PZ4 can connect to any RZ with a PZ port. This includes an RZ2, any RZ with an RZDSP-P card or any RZ5D. The diagram below illustrates the connections necessary for PZ4 manifold operation for an RZ2 and an RZ5D.



One or more ZCD headstage can be connected to the input connectors on the PZ4 back panel.

**Only TDT digital headstages can be connected to the PZ4.** No other connections should be attempted.

A 5-meter paired fiber optic cable is included to connect the preamplifier to the base station. The connectors are color coded and keyed to ensure proper connections.

The PZ4 battery charger connects to the round female connector located on the back panel of the PZ4 preamplifier. The battery will only charge when the power switch is in the CHG position.

## Power Switch

To turn the PZ4 on, move the two-position battery switch located on the front panel to the ON position. To turn the PZ4 manifold off, or to charge the battery, move the two-position battery switch to the CHG position.

## PZ4 Features

### Headstage LEDs

An LED for each headstage (labeled -A-, -B-, -C-, -D-) indicates whether or not a digital headstage is detected. Each LED turns green when a headstage is detected on the corresponding port. If the headstage configuration changes while the PZ4 is under power, all headstage LEDs affected by the change will turn red. For example, if a headstage connected to bank A is swapped with a headstage connected to bank B, the -A- and -B- LEDs that were previously green will turn red. This is an alert to the user that the PZ4 has reconfigured the channels. The red LEDs can be cleared by cycling the power on the PZ4.

### Status LED

The Status LED indicates if the PZ4 is synchronized to the RZ base station. It will turn green when synchronized and red otherwise.

### External Ground

The external ground is optional and should only be used in cases where the subject must occasionally make contact with a metal surface that isn't tied to the animal ground, such as a lever press. When contact is made, a ground loop is formed that temporarily adds extra noise to the system. Grounding this metal surface directly to the TDT hardware removes this ground loop at the cost of raising the overall noise floor a small amount.

A banana jack located on the back of the PZ4 (directly below the fiber optic port) provides connections to common ground for all channels. A cable kit is also provided to ensure cables used with the external ground are suitable for this use. Each kit includes: one male banana plug to male banana plug pass through and one male banana plug to alligator clip pass through. These cables also include ferrite beads to remove any potential RF noise that might travel through the cable. For best results position the ferrite bead close to the source of the RF noise.

## Battery Overview

The PZ4 manifold contains a Lithium ion battery pack.

## Battery Status LEDs



Eight LEDs on the front panel indicate the voltage level of the PZ4 battery. When the battery is fully charged, all eight LEDs will light green. When the battery voltage is low, only one green LED will be lit. If the voltage is allowed to drop further, the last LED will flash red. TDT recommends charging the battery before this flashing low-voltage indicator comes on. While charging, the Battery Status LEDs will flash red and green.

Status	Description
8 Green	Fully Charged
1 Green, 7 Unlit	Low Voltage
1 Flashing Red	Low Voltage - Charge Immediately!
Green/Red Flashing	Charging in Progress

## Charging the Batteries

The PZ4 power switch should be in the CHG position while charging, otherwise 50/60Hz noise will bleed into the recordings.

An external battery pack (PZ-BAT) is also available to provide longer battery life for extended recording sessions. See “PZ-BAT External Battery Pack for the PZ Amplifiers” on page 7-109.

## PZ4 Technical Specifications

Sample Rate	Up to 24414.0625 Hz
Power Requirements	One Lithium Ion cell at 12.75 AmpHours
Battery	5 hours to charge the battery 8-10 hrs battery life between charges
Charger	External 6 V, 3 A power supply
Indicator LEDs	Headstage status, battery life, sync status
Fiber Optic Cable	5 meters standard, cable lengths up to 20 meters*

**\*Note:** If longer cable lengths are required, contact TDT.