

The PZ2 Preamplifier

System 3

Overview. The PZ2 is a high channel count preamplifier suitable for extracellular recordings. The PZ2 preamplifier features a custom 18-bit hybrid A/D architecture that offers the advantages of Sigma-Delta converters at significantly lower power.

All PZ2 channels are organized into groups of 16 channel **banks** with each bank corresponding to a rear panel headstage connector and front panel LED display. Recorded signals are amplified, digitized and transmitted to the RZ2 base station via a fast fiber optic connection, capable of simultaneously transferring up to 256 channels for further processing. The extended bandwidth offered supports sampling rates up to ~50 kHz [on up to 128 channels] and improves signal fidelity, spike discrimination, sorting, and analysis.

Used exclusively with Z-Series base stations, PZ2 preamplifiers are available in 32, 64, 96, 128, or 256-channel models.

Power and Communication. Data from the PZ2 can be streamed across the fast fiber optic connection to the PZ fiber optic input on an RZ base station. Configuration information is also sent from the RZ to the PZ2 preamplifier across the same connection. The PZ2 preamplifier battery pack features two 10 AmpHour Lithium-Ion cells. An external battery pack [PZ-BAT] is also available to provide longer battery life for extended recording sessions.

Software Control. Software control is implemented with circuit files developed using TDT's RP Visual Design Studio [RPvdsEx]. Circuits are loaded to an RZ processor through TDT run-time applications such as OpenEx or custom applications via ActiveX controls.

Clip Warnings and Activity Display. 256 front panel LEDs can be used to indicate spike activity and/or clip warning depending on display mode and configuration. When enabled, LEDs for each channel may be lit green to indicate activity or red to indicate a clip warning. The **Display** button located on the front panel of the PZ2 toggles the clip warning and activity display LEDs between software control and standard operation. The **status LED** located below the Display button indicates the current display mode of the LED Indicators. **Note:** The LED Indicators are also mirrored on the RZ2 LCD display.



External Ground. A banana jack located on the back of the PZ2 provides connections to common ground for the first bank of channels [Ch 1-16].

PZ2 Preamplifier Part Numbers:

PZ2-32, 32-Channel PreAmp

PZ2-64, 64-Channel PreAmp

PZ2-96, 96-Channel PreAmp

PZ2-128, 128-Channel PreAmp

PZ2-256, 256-Channel PreAmp

PZ-BAT External Battery Pack

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Technical Specifications for the PZ2 Preamplifier

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|-----------------------|--|
| A/D: | Up to 256 channels, 18-bit hybrid |
| Maximum Voltage In: | +/- 10 mV |
| Frequency Response: | 3 dB: 0.35 Hz – 7.5 kHz 6 dB: 0.2 Hz – 8.5 kHz |
| Anti-Aliasing Filter: | 4th order Lowpass [24 dB per octave] at 7.5 kHz |
| S/N [typical]: | 73 dB |
| Distortion [typical]: | < 1% |
| A/D Sample Rate: | Up to 48828.125 Hz* |
| Input Impedance: | 100 kOhms |
| Battery Capacity: | 2 Lithium Ion cells at 10 AmpHours each |
| Battery: | Eight hours to charge both cells Battery life between charges, per cell: 32 ch ~ 13 hrs 64 ch ~ 11 hrs 96 ch ~ 9.5 hrs 128 ch ~ 8 hrs 256 ch ~ 5 hrs |
| Charger: | External 6 VDC, 3 A power supply |
| Indicator LEDs: | Up to 256 status or clip warning, battery life |
| Input Inferred noise: | 2 μ V rms typical 300 - 7000 Hz, 8 μ V peak typical |
| Fiber Optic Cable: | 5 meters standard, cable lengths up to 30 meters |

*Note: When sampling at a rate of 48.828 kHz the PZ2 preamplifier is limited to a maximum of 128 channels.

