

# The RZ2 BioAmp Processor

System 3

**Overview.** The RZ2 processes and filters acquired signals and can be used to control digital I/O and/or generate analog signals. This device features multiple ultra-fast digital signal processors networked on a novel bus architecture that speeds both onboard communication and memory access. Faster clock speeds and enhanced processing power improve channel count and allow for simultaneous acquisition on all 256 channels. Physiological signals can be digitized on a preamplifier and streamed to the RZ2 over a fast fiber optic connection. The RZ2 also features 16 channels of analog I/O, 24 bits of digital I/O, two legacy optical inputs for Medusa preamplifiers, and an onboard LCD for system status display.

**Power and Communication.** The Optical Gigabit PC interface ensures fast and reliable data transfer from the RZ2 to the PC and is integrated into the device. The RZ2's power supply is also integrated into the device and is shipped from the factory configured for the desired voltage setting [110 V or 220 V].

**Specialized DSP/Optical Interface Boards (Optional).** The RZ standard DSP boards can be replaced with specialized DSP boards which include an optical interface for communication and control of RZ compatible devices, including the IZ2 Stimulator, RS4 Data Streamer, PO8e Interface, PZ Amplifier, and RV2 Video Tracking System. RZ devices equipped with one or more specialized DSP boards include an optical port for each of DSP.



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

**PZ Amplifier Fiber Optic Port.** The RZ2's primary amplifier input is a high-speed fiber optic port that allows a direct connection to a Z-Series preamplifier. It can input up to 256 channels at a maximum sampling rate of ~25 kHz or 128 channels at a maximum sampling rate of ~50 kHz.

**Legacy Fiber Optic Ports.** Two legacy fiber optic ports are provided to support simultaneous acquisition from up to two Medusa preamplifiers. Each port can input up to 16 channels at a maximum sampling rate of ~25 kHz. The Legacy fiber optic ports can be used with any of the Medusa preamplifiers including the RA16PA and the RA4PA or the RA8GA adjustable gain preamplifier.

#### RZ2 Base Station Part Numbers:

RZ2-2, BioAmp Processor with Two DSPs

RZ2-4, BioAmp Processor with Four DSPs

RZ2-8, BioAmp Processor with Eight DSPs

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**Digital Input/Output.** The digital I/O ports include 24 bits of programmable I/O. All digital I/O lines are accessed via the 25-pin connector on the front of the RZ2 and 16 channels are available through BNC connectors on the front panel.

**Onboard Analog Input/Output.** The RZ2 is equipped with eight channels of 16-bit PCM D/A for stimulus generation and experiment control and eight channels of 16-bit PCM A/D for input of signals from a variety of other analog sources. All 16 channels can be accessed via front panel BNCs or via a 25-pin analog I/O connector.

## Technical Specifications for the RZ2 Z-Series Base Station

The RZ2 is rack mountable in a standard 19" rack and is 3 U [5 1/4"] tall.

DSPs:	Up to Eight: 400 MHz DSPs, 2.4 GFLOPS peak per DSP
Memory:	64 MB SDRAM per DSP
Digital-to-Analog Converter:	8 channels, 16-bit PCM
Sample Rate:	Up to 48828.125 Hz
Frequency Response:	DC-0.44*Fs (Fs=sample rate)
Voltage Out:	+/- 10.0 V
Signal-to-Noise [typical]:	82 dB [20 Hz - 20 kHz at 9.9 V]
Output Impedance:	10 Ohms
Analog-to-Digital Converter:	8 channels, 16-bit PCM
Sample Rate:	Up to 48828.125 Hz
Frequency Response:	DC - 7.5 kHz [3 dB corner, 2nd order, 12 dB per octave]
Voltage In:	+/- 10.0 V
Signal-to-Noise [typical]:	82 dB [20 Hz - 7.5 kHz at 9.9 V]
Input Impedance:	10 kOhms
Z-Series Fiber Optic Ports:	One 256-channel input Note: The max sample rate is limited to 24414.0625 Hz when recording 129 - 256 channels
Legacy [Medusa] Fiber Optic Ports:	Two 16-channel inputs
Digital Input/Output:	8 programmable bits: 3.3 V, 25 mA max load 2 programmable bytes [16 bits]: 5.0 V, 35 mA max load

