

The IZ2 Stimulator and LZ48 Battery Pack

System 3

Overview. The IZ2 Stimulator converts digital waveforms into analog waveforms as part of a computer-controlled neural microstimulator system that delivers user-defined stimuli through multichannel electrodes. The IZ2 can output either a voltage-controlled waveform or a current-controlled waveform and provides feedback of the actual voltages delivered to the electrodes.

The IZ2 stimulator features 32, 64, or 128 channels that can deliver arbitrary waveforms of up to 80 kHz bandwidth. Each channel uses PCM D/As to ensure sample delays of only 4 samples and square edges on pulse stimulation waveforms. A proven digital communication system optically isolates the electrical stimulator from the waveform generators to eliminate AC power surges and noise, ensuring superior safety and performance. The IZ2H is a high current range version of the IZ2 and is available with sixteen stimulus channels.

Special circuitry on the stimulator draws on an LZ48 battery pack to convert low voltage waveforms from the D/A converters to constant voltage or constant current waveforms.

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.



Power and Communication. The LZ48 Battery Packs use multiple Lithium Polymer [LiPoly] batteries to power both the stimulation and the IZ2 stimulator logic circuitry. A 24 Volt battery charger with 2.7 A of current capacity is included with the stimulator and can be connected via the connector on the LZ48's back panel.

Configuration information and data is transferred between an RZ processor and the IZ2 Stimulator across the fiber optic connection.

IZ2/LZ48 Stimulator System Part Numbers:

- IZ2-32, 32-Channel Stimulator
- IZ2-64, 64-Channel Stimulator
- IZ2-128, 128-Channel Stimulator
- RZ-DSP-I, RZ DSP for IZ2
- LZ48-200, 200 Wh Battery Pack
- LZ48-400, 400 Wh Battery Pack

The IZ2/LZ48 Stimulator

Technical Specifications for the IZ2 Stimulator

Stimulus Output Channels:	16, 32, 64, or 128 PCM D/A
Stimulus Output Voltage [max]:	+/- 12 V with LZ48
Stimulus Output Current [max]:	IZ2: +/- 300 μ A up to 50 kOhm load with LZ48 IZ2H: +/- 3 mA up to 5 kOhm load with LZ48
DC Offset Current:	< 100 nA on active channels and < 3 nA on open channels
Sampling Rate:	Up to 50 kHz [w/ RZ2] Up to 200 kHz [up to 32 ch w/ RZ6 only]
Power Control/Stimulation:	LZ48 Rechargeable Battery with Li-Poly batteries

Technical Specifications for the LZ-48 Battery Pack

Battery Life:	200 Wh [LZ48-200] or 400 Wh [LZ48-400]
Rechargeable:	Yes
Compliance Voltage:	+/- 15 V
Maximum Impedance for Delivering a 300 microAmp Current:	50 kOhms

