PLEXON
Neurotechnology Research Systems

PlexStim™ Electrical Stimulator 2.0

The PlexStim™ Electrical Stimulator 2.0 (PlexStim) is an electrically isolated 16 channel constant current stimulator system with 16 individually programmable current sources that share a common return path. The stimulator can generate arbitrary waveform patterns, that can be initiated for the GUI software interface, user program or from externally triggered digital inputs. The high-precision stimulator delivers waveforms with 30nA resolution and 1µsec temporal resolution. The actual current and voltage delivered to any electrode can be conveniently monitored on a per-channel basis.

Features

- 16 channel constant current stimulator
- Electrically isolated from main power supply
- Accuracy of 1µsec temporal resolution, and 30nA current resolution (in stimulation mode), with 16-bit resolution
- Integrated impedance testing
- Arbitrary stimulation waveform patterns
- Voltage and current monitor channels – view in real time the current flowing through and the voltage applied across any one electrode at a time
- 16 independent digital inputs, for triggering stimulation protocols
- 17 digital outputs for synchronizing stimulation pulses with other electronic equipment
- Software controlled, USB 2.0 interface
- Maximum Current ±1mA
- Compliance Voltage 10V @ 700µA
- ***NEW*** SDK available for C/C++ and MATLAB®

Easy-to-use Software Interface

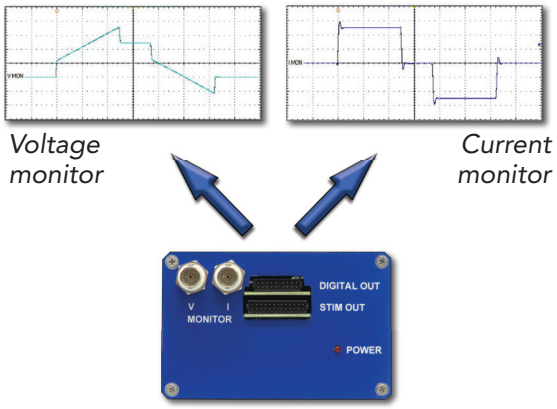
The graphical user interface makes it easy to generate bi-phasic pulses and bursts of pulses repeated at specific rates. More complicated rectangular waveforms and non-rectangular arbitrary waveforms may be defined in and loaded from a simple text file. In addition, a software SDK is available in C/C++ or MATLAB which may be used to create stimulation waveforms or pulse patterns outside of the Plexon GUI interface, and downloaded to the PlexStim.

Programmable Stimulation Waveforms

The stimulator can deliver arbitrary stimulation waveforms. The waveform current values are first defined within a text file and then downloaded to the PlexStim via the software interface. In this way, biological signals recorded by data acquisition systems or curves derived from mathematical functions can be used as stimulation waveforms. Stimulation pulses can be repeated to generate pulse trains with arbitrary intra- and inter-burst intervals. Different waveform patterns and protocols can be applied to each of the 16 stimulation outputs. Stimulation protocols can be repeated up to 32,767 times, and then stopped either manually or on a trigger event. The internal 1MHz clock guarantees precise timing across channels and over time.

Current and Voltage Monitor Channels.

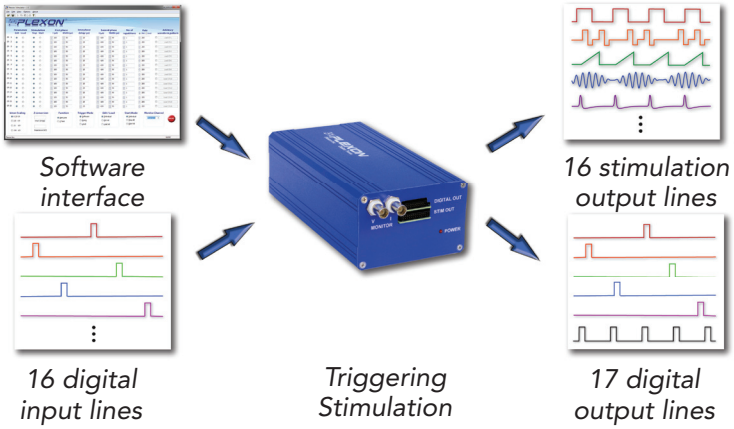
The actual current and voltage delivered to any one electrode can be conveniently monitored on an oscilloscope using the standard BNC monitor outputs.



Voltage and Current monitor outputs

Triggering Stimulation

Every stimulation pattern can be started and stopped manually, either within the software interface, or with an external trigger (TTL). The PlexStim allows you to trigger each of the 16 analog output channels independently. Complex stimulation patterns can be delivered in this way with precise timing based on different triggers. Each channel has a dedicated digital input that may be used in an edge triggered or level triggered (gated) mode to initiate stimulation with microsecond latency. Each channel has a dedicated digital output to signal to other devices the precise time when stimulation is occurring.



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