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BrainChem, LLC

Instant Electrochemical Measures of Glutamate in the CNS

Instantaneous acquisition and data analysis

The GD-1 (Glutamate Diagnostic) records electrochemical data (using constant potential amperometry) from up to 8 independent channels, digital (event), and marker information. It features high-speed data capture at rates up to 1.2 GHz with 16-bit resolution.



Windows-based software is used for recording from up to 8 channels from separate recording sites on an individual microelectrode in one subject. Note: cannot record more than one subject at a time.

Applications

Direct *in vivo* glutamate measures on a second-by-second basis.

Further Information

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Technical Data

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Analog I/O	8 channels of 16-bit waveform input, $\pm 10V$ 16-bit 1.2 GHz ADC
Digital I/O	4 handshake lines for single bit input and output; 1 push button handshake line
Host interface	System computer (included) has standard computer USB based format for retrieving data
Case and power supply	Battery powered with recharging capabilities via external 110V-240V 50-60Hz auto-sensing power supply AC to DC 5V 600mA Internal DC to DC 15V GD-1 Case size: Front panel: 19" W, 1.75" H Chassis: 17.4" W x 8.25" L Standard rack mountable or can be placed on stand alone cart constructed of high strength anodized aluminum for durability, versatility and electronic shielding.
Software	Windows XP (Professional Edition Only) or Vista
Headstage	Low noise, four channel, pre-amplifier system/headstages capable of converting current to voltage. Headstage designed to connect to the microelectrodes with minimal noise interference. Standard system includes 1 headstage. Gain is 2 picoamps/mv (can be modified per customer request).
Control Box	Provides control, programmable gain, D/D and auxiliary inputs, and outputs for up to 8 channels of electrochemical recording in a subject. Programmable gain (adjustable voltage input range) is software controlled. System consists of isolation between channels and independent power supplies (110/60Hz and 220/50 Hz compatible). GD-1 has all channels active and sampling virtually simultaneously. They are multiplexed, but with a lag of less than 10 msec/channel. GD-1 has 4 digital I/O lines currently active (for TTL events/external event switch) expandable to 24 digital lines.
A/D Board	The GD-1 system currently uses a modified AD board having 16 bit analog to digital conversion and 16 bit D/A conversion for analog waveforms.
GD-1 Software	Current software is capable of amperometry. The software is a combination of oscilloscope displays to record raw data and an automated strip-chart recorder to display, in "real time", data from individual microelectrode recording sites in either raw current or glutamate concentration. GD-1 system currently operates with all channels capable of being displayed on a second-by-second basis. GD-1 has an active measurement tools window so user can obtain previously recorded glutamate release measures. This can be accessed during acquisition to verify ongoing data while still recording. GD-1 primary data files are saved in a format compatible with various database programs. All files for electrode calibration and data acquisition are readily accessible in a secure integrated file management utility.
Microelectrodes	GD-1 LOD for Glu is <0.2 mM. GD-1 is designed to work with our proprietary, specially designed and modified ceramic microelectrode arrays for measuring glutamate.

