

[™]STIM²

STIM² Simple, Powerful, Accurate Stimulus Delivery and Experimental Control Solution.

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[™]**STIM**² Simple, Powerful, Accurate Stimulus Delivery and Experimental Control Solution.

STIM² is designed to deliver scientific stimuli with all the quality our customers have come to expect from Neuroscan.

Operating under Windows[®] 7, STIM² provides a familiar and simple interface to design and deliver stimuli with ease and, more importantly, accuracy. STIM² provides complete control of the experiment, while delivering the highest quality stimuli.

STIM² is a comprehensive stimulus presentation system consisting of a library of sensory, cognitive and neuropsychological tasks. It is a modern tool that provides well-defined and widely known paradigms that may be used as a stand-alone package, or integrated fully with the CURRY acquisition system, by providing synchronized trigger pulses. Whether the user's interests lie with basic sensorimotor and perceptual tasks, more complex recognition tasks, or the most sophisticated cognitive processes, STIM² can deliver the stimuli with the precision needed for accurate analysis.

STIM² is fully integrated with the Cedrus StimTracker. This system uses photocells and auditory threshold detection to identify stimulus onset with the greatest accuracy possible.



Audio files may be created, reviewed and modified in the Sound Editor. Trigger placement is as easy as positioning the mouse cursor.

Task Library - Fourteen tasks are pre-programmed into the STIM² software to provide a task library to build upon. Each task allows the user to modify parameters, such as, the duration, order of presentation, the interstimulus interval, performance feedback options, and many more. The programs are categorized into Motor, Perceptual, Attention, Memory, and Cognitive tasks. Some of the more common tasks include Finger Tapping, Stroop, Card Sorting, and Categories tasks from neuropsychology. Additional tasks include pattern reversal, Naming, Visual tracking, Spatial memory, Visual and Auditory continuous performance, Verbal learning, and Visual memory tasks.

Task Generation - Creating custom tasks with ease is the most important element in a stimulus program. The Gentask utility program provides an effective tool to create the user's own tasks with no programming skills required

Image and Sound Files - Common audio files (including WAV and Neuroscan SND files) and video files (including JPG, BMP, PCX, PNG, TIF, CUT, etc., files) are easily presented. Users can create their own sounds using the Sound Editor and convert graphics file types to ones handled by STIM² using the Image Converter. Audio and visual stimuli can be presented simultaneously while having flexibility in the placement of the trigger pulse in relation to a stimulus.



Principle categories of tasks.

Audio	CPT Filename	C:\Program Files (x86)\Neuroscan\Stim2\Data\AudCPT Demo.aud							
Ou	tput Filename	D:\Stim2 Test Files\HTML files\audcpt repeat with 707 mouse.html							
Audio S	equence File	C:\Program F	iles (x86)/Neu	uroscan\Stim	2\Samples\Aud	dio.aseq			
ckground So	und Filename								
F	Random Seed			10					
Nur	nber of Trials			1000					
Interstin	nulus Interval	9		2000.00					
Interst	mulus Range	9		100.00					
Subje	ict Response			Yes					
U	Error Prompt			Yes					
Sta	ting Reward			0.000000					
Cor	rect Reward	0.000000							
		0.00000							
	Error Debit			0.000000					
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Example of programmable parameters for an Auditory P300 paradigm.

Trial	Word	Color	Type	Response	Correct	Latency
1	1	3	2	-1	0	1000
2	1	4	2	-1	0	1000
3	3	2	2	-1	0	1000
4	2	4	2	-1	0	1000
5	4	3	2	-1	0	1000
6	1	4	2	-1	0	1000
7	3	3	1	1	0	394
8	0	0	1	0	0	0
9	2	1	2	-1	0	1000
10	1	2	2	-1	0	1000

Example of the behavioral results data file.





Data Analysis - Behavioral data (performance results) from the tasks are available for review in the Internet Browser, and the ASCII file versions of these files can be transferred to CURRY for integration with the EEG data files.

Integration - STIM² will integrate with other recording devices, allowing the user to trigger external devices (such as an SEP stimulator). The seamless integration with Neuroscan data acquisition products allow on-line averaging, sorted averages based on trial type, accuracy and latency of responses, and sequence recognition.

Label	Mode	Duration	Window	ITI	XPOS	YPOS	Response	Type	1
1	RESET	NC	0	0	0	0	0	0	0
2	CUT	- 100.00	1000.00	1500.00	250	0	2	2	C:\Program Files (x86)\Neuros
3	MUTEON	100.00	1000.00	1500.00	250	0	2	2	C:\Program Files (x86)\Neuros
4	NOISEOFF	100.00	1000.00	1500.00	250	0	2	2	C:\Program Files (x86)\Neuros
5	NOISEON	100.00	1000.00	1500.00	-250	0	1	1	C:\Program Files (x86)\Neuros
6	PCX	100.00	1000.00	1500.00	-250	0	1	1	C:\Program Files (x86)\Neuros
7	RESET	100.00	1000.00	1500.00	250	0	2	2	C:\Program Files (x86)\Neuros
8	RESP	100.00	1000.00	1500.00	-250	0	1	1	C:\Program Files (x86)\Neuros
9	SND	- 100.00	1000.00	1500.00	-250	0	1	1	C:/Program Files (x86)/Neuros
10	CUT	100.00	1000.00	1500.00	250	0	2	2	C:\Program Files (x86)\Neuros
11	CUT	100.00	1000.00	1500.00	250	0	2	2	C:\Program Files (x86)\Neuros
12	IF	NC	7	10	GOSUB	200	GOSUB	100	
13	GOTO	1							
100	CUT	1000.00	0.00	2500.00	0	0	-1	10	C:\Program Files (x86)\Neuros
15	RETURN								

Example of an easily programmed file for controlling stimulus presentation.

Gentask Editor - One of the most popular programs in STIM² is the Gentask Utility program, since it allows maximum control over stimulus presentation. The heart of Gentask is a "sequence file", a line-by-line program that governs many aspects of stimulus presentation STIM² features a Gentask Editor that makes creating and modifying sequence files much easier.



Event A Type: Group: Type: 2 2 2 2 2 2 2 2 2 2 2 2 2	verage (1 Group J 3 4 5 6 chultple> abel: al 207/207 c 0112 424 0013.592 0014 598 0017.024 0013.592 0019.620 0019.620 0023.024 0022.056 0025.276 0025.276	Active): 7 8 9 1 V Condition Select Even V 1 V 2 al4	0 1 t Types	Count 41 165 1	Stimu in STI on the	lus and Re M ² are use e basis of v	spons d in C ariou	se type code: URRY to sort s criteria.	s set t epoch:
Conditions Add Condition	Remove All	Show Errors	Conditions	Status: valid					
Operator (Check Event	n-Back/Fwd	Constrain to	Check Timerange	From(ms)	To[ms] Re	ation	Event Type)	
and and		1	Al		150.00	1000.00 is		1	
						ОК	Can	cel Help	
2 2 2 1	00:46.464 00:47.516 00:48.672 00:50.024 00:51.380	0.972 1.052 1.156 1.352 1.356	~						

In the sequence file, the user can set the duration of presentation, the time allowed for a valid response, the interval between stimuli, the position of the graphics file on the screen, the decibel levels for audio files (independent left and right channel settings), the correct

expected response, and the trigger type code sent to the acquisition system, for each stimulus that is presented. A drag-and-drop feature allows the user to add lines to the file with maximum ease. Additional options with the sequence file include flow control and conditional branching commands, counters, ways to build more complex stimuli, increasing/decreasing difficulty levels based on past performance, mask options, noise options, and many more.

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STIM² is fully integrated with the Cedrus StimTracker to provide the most accurate timing possible

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System Configurations

STIM² may be obtained in three configurations. The recommended option is the **STIM² Complete System**. This package comes with a computer that has been calibrated for SPL and audio and video timing. It includes a seven button response pad, ear insert headphones, an isolation transformer, and a Cedrus StimTracker unit that will achieve the best timing accuracy possible. The StimTracker is fully integrated with CURRY, allowing you to align stimulus events with the more precise events from the StimTracker.

The dB level of the sound files can be controlled by the software, and the user has the option to use the mouse, keyboard, or the seven-button response pad as the subject response device. STIM² will send precisely timed trigger pulses to the CURRY acquisition system and these will appear as trigger type codes in the continuous data file.

The second STIM² variation is the **STIM² with Hardware** option.

This is like the STIM² Complete system, except the computer is not supplied. The StimTracker is not included, but it may be ordered as an add-on. The disadvantage of this system is that it is not calibrated for dB level or timing. It is possible to perform the sound calibration yourself (with a dB meter and special coupler). Timing is dependent on Windows 7, which is improved with the StimTracker.

The third variation is the **STIM**² **Software Only** version. It is up to the user to provide the computer, headphones, response pad, etc. Calibration is left to the user. The StimTracker may be purchased as an add-on.

Timing and Accuracy Specifications

AUDIO TIMING

• Trigger to audio onset reliability ± 5ms (Software Only, parallel port) onset reliability ± 1 sample (with StimTracker)

VIDEO TIMING

- Trigger to video onset reliability \pm 1ms

STIM² Complete

AUDIO

- Noise 106dB SNR
- Resolution 24 bits
- Rate 192 kHz
- SPL 0-120dB with .75dB steps independent left/right channel control

VIDEO

- 1GB RAM Minimum
- Dual monitor support
- To available refresh rate of system
- Minimum resolution 1024 x 768 higher resolution graphics card dependent
- Built in hardware acceleration with Microsoft[®]DirectX[™] Support

RESPONSE DEVICE

 Keyboard, Mouse & 7-button hardware latched response pad

STIM² Software Only

AUDIO

Dependent on user's hardware*

VIDEO

Dependent on user's hardware*

RESPONSE DEVICE

Keyboard, Mouse & 7-button hardware latched response pad

*Neuroscan cannot guarantee timing with end-user supplied hardware.



For more information please contact:

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