



## Release Notes: Cascade v2.5 SP2

### What's New in 2.5 SP2 versus 2.5 SP1?

#### *Simulator mode enabled.*

Simulator mode is fully functional and includes support for the ES-IX and TCS-4. Double-click on `UseHardwareSimulator.reg` in `C:\Cadwell\Cascade` to enable the simulator and double-click on `UseHardware.reg` to enable standard hardware acquisition mode.

#### *Greater Stimulation Flexibility*

- The ES-IX can be used as a Paired Stimulator for peripheral facilitation of MEPs
- TCS stimulators can be used in EP modes to average MEP responses (e.g., D-waves). A warning is displayed when an EP mode is started and a TCS is assigned as the stimulator for that mode.

#### *New Cascade Flash Utility*

Cadwell has added a New Firmware Flash Utility that burns firmware onto new Elites, PROs, and ES-IXs included in 2.5 SP2. This will keep your Cascade systems up-to-date on the latest firmware.

#### *Easier Setup*

- Upon installation, the install files are copied to the harddrive for easy access in the future.
- Internet access not required if Adobe Flash 9 or 10 is already installed.
- Color Options in System Setup are available for mode channels 17-32.

#### *Bug Fixes*

Fixes for the following bugs were implemented in 2.5 SP2:

- Fixed issue where the Averager resets when All Auto modes or All Manual modes were stopped then re-started.
- Fixed issue where EMG Audio Switched to Bad Artifact Sounds Intermittently.
- Fixed issue where ES Detector and TCS connected simultaneously may cause 'No Amp' error.
- Fixed issue where MEP cursors did not autoplace when traces were autostored.
- Fixed issue where TCS stim did not provides current sensing in Paired Stimulation.
- Fixed issue where the following trace display views did not update until the window was refreshed:
  - Deselecting channels in NerveGuard
  - Changing the gain to stored EMG traces in review mode
  - Graticules and cursors on TOF modes in review
- Fixed issue where EEG traces in lookback mode could not be deselected via context menu.
- Fixed issue in Edit Procedure Setup where Window checkboxes were not displayed correctly in layout windows view.

- Fixed issue where VEP goggles did not flash on in response to a Single Stim trigger.
- Fixed issue where changing amplifier gain in dialogue box through context menu changed the displayed waveform in the opposite direction of the gain change until after the setting was applied.
- Fixed issue where Deselecting or Selecting Show trial numbers only takes effect on new trials. These changes are now retrospective on all traces except baselines.
- Fixed issue where Bite Block warning for MEP modes does not appear when triggering for the first time from the right-click context menu.
- Fixed issue in Cascade DM where there was no option to Delete Users and Patient entries from the database.

## Cascade v2.5 SP2 minimum computer requirements:

The computer used to run the Cadwell Cascade, Elite, or PRO is an integral part of the neuromonitoring system. For optimum performance of the system use a computer that meets the following criteria.

	Minimum	Recommended
<b>Operating System</b>	32-bit Windows XP Professional SP3 32-bit Windows 7 (Please see Configuring Cascade for Windows 7 for additional setup instructions, document 369028-626 on DVD)	
<b>Processor</b>	2.13 GHz <b>Dual Core</b> processor, Cascade 2.5 will run much slower on computers with single-core processors.	
<b>Hard Disk Drive</b>	80 Gigabytes Capacity, 5 GB free-space	40 GB free space
<b>Memory (RAM)</b>	3 GB	
<b>Archive Device</b>	Any Windows supported device	
<b>Graphics</b>	1024 x 768 resolution; 16 MB, 32-bit color depth ( <i>supported</i> , but not recommended)	1600 x 900; 64 MB ATI Graphics
<b>Base Unit Communication</b>	10 Base-T Ethernet connection	
<b>Network Connectivity</b>	Second Ethernet connection (e.g., Ethernet card) required for simultaneous connection to base unit and network	
<b>Regulatory Requirements</b>	U.S. and Canada: Equipment must meet UL1950 or IEC950  European Union: Equipment must meet EN60950	

## Cascade v2.5 SP2 minimum Cadwell system requirements:

Hardware Type	Cascade Version	Base Version	Junction Board SW	Estim Board SW
<b>16-Channel Cascade</b>	2.5 SP2	3.27	2.2	5.8 or 5.9
<b>32-Channel Cascade Elite</b>	2.5 SP2	3.86	2.2	5.9 If ES-IX, v0.9
<b>Cascade PRO (16 or 32)</b>	2.5 SP2	1.09	2.2	ES-IX, v0.9

## Installation/-Uninstall Instructions

See Document 369024-934 Rev 2.5 SP2 for Cascade 2.5 SP2 software installation instructions. These instructions are located under **2.5 SP2 Files\Documents** on the installation DVD.

## Known Issues (Errata)

- Portal function is disabled in Cascade 2.5 (connect to base feature).
- Group cycling with Group Cycle reaches set to a number less than 'Completion' does not function. Works fine as long as Group Cycle reach is set to 'Completion'.
- Play sound on stim does not work for "Single" trigger stimulation. This feature works as intended for other modes of stimulation.
- CascadeIP.exe must be run twice on Windows 7 PCs. The first instance will produce an error, but the second run will work.
- Cascade DM: Import tool closes when canceling out of login screen.
- Issues remaining from prior Cascade versions (2.2 and earlier):
  - Traces displayed in trace windows (including summary windows) are based on mode channel order, not amp channel number. When channels are added or deleted from a mode, previously stored data remain in their previous location on the display window. Thus, channel labels are for data recorded from the current channel configuration, not from previous channel configurations.
  - On rare occasions, TOF may stimulate a fifth pulse after full four sweeps are recorded. No data are recorded from the fifth pulse.

## FAQs

### *If I have an older PC with a single core processor, should I try installing 2.5 SP2?*

No, installing 2.5 SP2 on a single-core processor will slow-down the application dramatically.

## ***How important is this update if I am currently running 2.5 or 2.5 SP1? What if I am running 2.2 or earlier?***

2.5 SP2 has several important bug fixes and feature enhancements over 2.5 and 2.5 SP1. If you are running one of these versions, we recommend you update as soon as possible. If you are running a previous version of Cascade (2.2 or earlier), you should consult the PC requirements and list of 2.5 features to determine whether you should update your PC.

## **What's New For Users Who Haven't Used 2.5?**

### ***Support for the Cascade PRO 16/32***

The Cascade PRO is an innovative neuromonitoring system that takes the best of the Cascade and Cascade Elite systems and combines them into a single system that is yours to configure. This system offers the power of our Elite 32 channel signal processor, in a very portable package similar in configuration to our venerable Cascade. The Cascade PRO can be seamlessly configured by the user to accommodate either one or two 16-channel amplifiers, providing you with greater flexibility in switching between 16- and 32-channel IOM systems.

### ***Support for the new Electrical Stimulator: ES-IX***

The ES-IX represents a dramatic shift in Cadwell's line of electrical stimulators. The ES-IX has 8 high current (0-100 mA) outputs and 1 low current/voltage output. The low current/voltage output has 4 software-configurable modes of operation: 1) 0-5 mA constant-current, 2) 0-20 mA constant-current, 3) 0-5 V constant-voltage or 4) 0-20 V constant-voltage. The 8<sup>th</sup> high-output channel can function as either an 8<sup>th</sup> high-output channel (in which case it functions the same as the other 7 high-outputs) **or** as the controller/stimulator for a mono-polar probe. A second ES-IX can be "daisy-chained" to the first, giving you a total of 16 high current and 2 low current/voltage outputs. Via the Cascade software, the cathode and anode can be reversed, the phase of the stimulation can be adjusted (including output of biphasic stimulation), rapid trains can be delivered, and current and voltage sensing is available on all outputs. Complete with new rugged connectors. The ES-IX is compatible with the Cascade Elite, and Cascade PRO systems, but cannot be run on the legacy Cascade 16-channel system.

### ***Support for the new Transcranial Stimulator: TCS-4***

The TCS-4 is a new transcranial stimulator with four user-selectable output channels (4 stimulation pairs, 8 total outputs, 2/channel). This device, similar to our current TCS-1000, delivers high voltage, rapid trains of up to 9 pulses (all delivering 1000 V at 50 us and up to 800 V at 75 us), adjustable pulse width of 50 & 75 us with the added flexibility of 4 outputs. Thus, the clinician can place the TCeMEP stimulating electrodes in multiple locations (i.e. C1-C2, C3-C4, Fz-Cz) and choose the stimulation pair that obtains the best TCeMEP responses in that specific patient or procedure.

### ***Bite Block Warning***

Prior to the first trigger of a TCS in an MEP mode, the monitorist is reminded to check to make sure a bite block is in place. This reminder pops up only once each time a new instance of the Cascade application is initiated, and only when the "TCS" is selected as the stimulator type for the first MEP mode that is activated.

### ***Ability to stimulate non-interleaved modes at repetition rates greater than 40 Hz.***

Cascade 2.5 provides the ability to stimulate at rates up to 66 Hz for non-interleaved modes. Repetition rates on interleaved modes are still limited to 40 Hz.

### ***Decreased processing time between interleaves allows higher repetition rates on interleaved modes.***

Cascade 2.5 reimplemented the version 1.9 algorithm for interleaving non-auditory stimulation modes, reducing the processing time between consecutive interleaves. This allows the user to stimulate interleaved modes at slightly higher repetition rates.

### ***Decreased EMG audio delay and improved EMG audio quality on the Cascade Elite.***

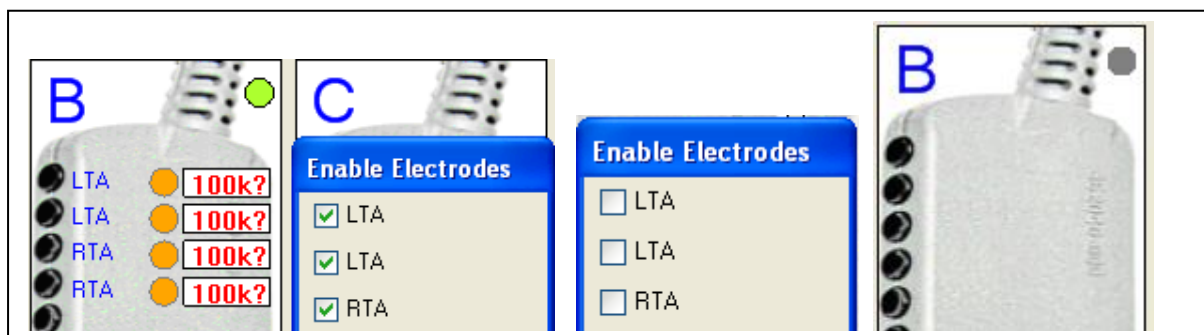
Several improvements were made to EMG audio to improve audio timing and quality on the Elite.

### ***Improved performance of EMG threshold tones.***

For an individual channel, threshold crossings that occur during the playback of a tone from a previous threshold crossing on the same channel are not played. The first threshold crossing that occurs after the tone plays fully will trigger another threshold tone. This prevents garbled sounds that resulted from multiple threshold crossings on the same channel within a short period of time.

### ***New option allows deselecting channels in the impedance calculation window.***

The Cascade impedance algorithm introduced in v2.2 looks at all channels used in any montage for the calculation. Version 2.5 allows users to deselect channels they do not connect to the patient for that recording, allowing the user to get an accurate impedance calculation. Simply right click on the pod you want to exclude channels from, uncheck the boxes for those channels to be removed from the impedance calculation. Then click OK. This will exclude those inputs from the impedance calculation for the remainder of the recording.



### ***New application for registering Cascade application \*.dll files***

RegisterCascade.exe is a new application loaded when Cascade v2.5 is installed. It makes it easy to reregister and un-register Cascade application \*.dll files. It is located in the C:\Cadwell\Cascade directory.

## New Alerts

**Crash Reports.** Cascade and other related applications will now create a folder on the desktop and automatically create a crash report if the application has a problem and closes unexpectedly. These reports will help Cadwell to quickly determine the cause and fix the issue.

## Ability to lock Amp Channels across tests

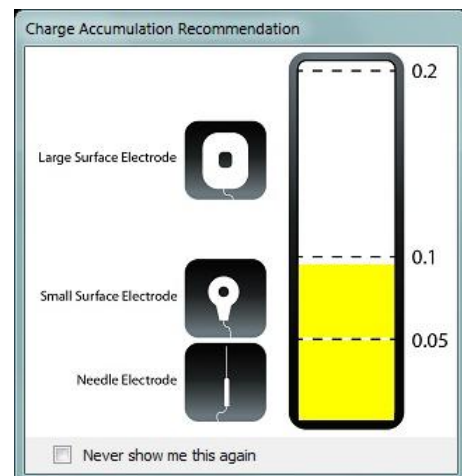
Reimplemented this feature from Cascade 1.9. Users can once again lock channels in the Channel Setup screen. When this option is selected for a given channel, the channel settings for that channel are updated simultaneously across all tests.

## Decreased reset time of Cascade Elite and PRO base units

The 16-Channel Cascade system reset much faster than the Elite under previous releases of Cascade software. Cascade 2.5 greatly speeds up the recovery time of the Elite.

## Charge accumulation recommendation popup

Charge accumulation popup reminds user to keep current at levels that are less likely to cause tissue damage. The popup appears as you increase the stimulation amplitude during a procedure. The scale of the popup is in Coulombs/hour, and is a function of the stimulus amplitude, pulse width, rep rate, and stim ON time. Electrodes with smaller surface areas are more likely to cause charge accumulation-related tissue damage. The popup serves as a recommendation and disappears automatically after 3 seconds. The popup does not appear for modes with biphasic stimulator(s). The popup can be permanently disabled for each user by clicking "Never show me this again."



## Improved Function of Group Cycle

Setup your group cycle properties to advance to the next group when all modes reach completion. Each group will run until all modes in the group reach their full average count. At that time, the next group will begin. Each time a group begins a new cycle, all modes are cleared and started again.

