



**Stimulation  
User's Manual**

**Version 2.0**



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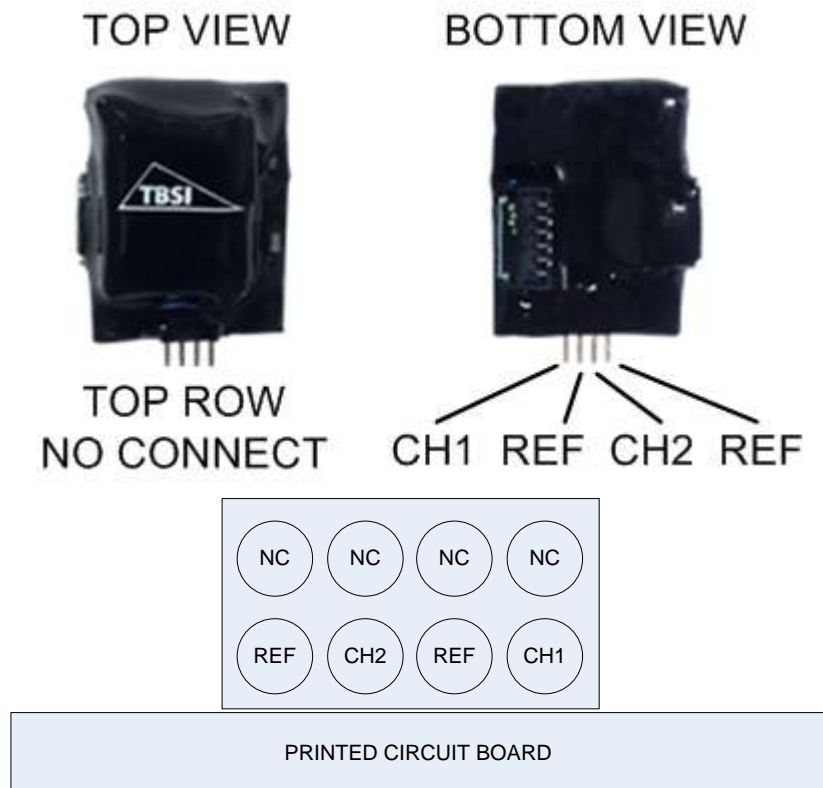
## Document Overview

This document will demonstrate how to use the TBSI STIMWARE hardware and software. The program controls a single 2 channel headstage that allows researchers to generate and upload two separately customizable waveform patterns via a simple USB interface. The headstage is battery operated therefore only needs to be connected to USB for charging or pattern download.

## Shipped items list

- 2 Channel Stimulation Headstage
- StimWare Installation CD
- Trigger/Power Magnet Wand
- Stim Signal Test Load Board

## Headstage Pinout



## Mating Connectors

- Sullins GRPB042MWCN-RC
- Sullins LPPB042CFN-RC

## Software & Hardware Installation

### ◆ System Requirements

The recommended minimum PC requirements are as follows:

- At least 1.0 GHz Processor
- 2 GB of storage memory
- 1 GB RAM
- (1) USB 2.0 port
- Windows XP OS Service Pack 2 or later

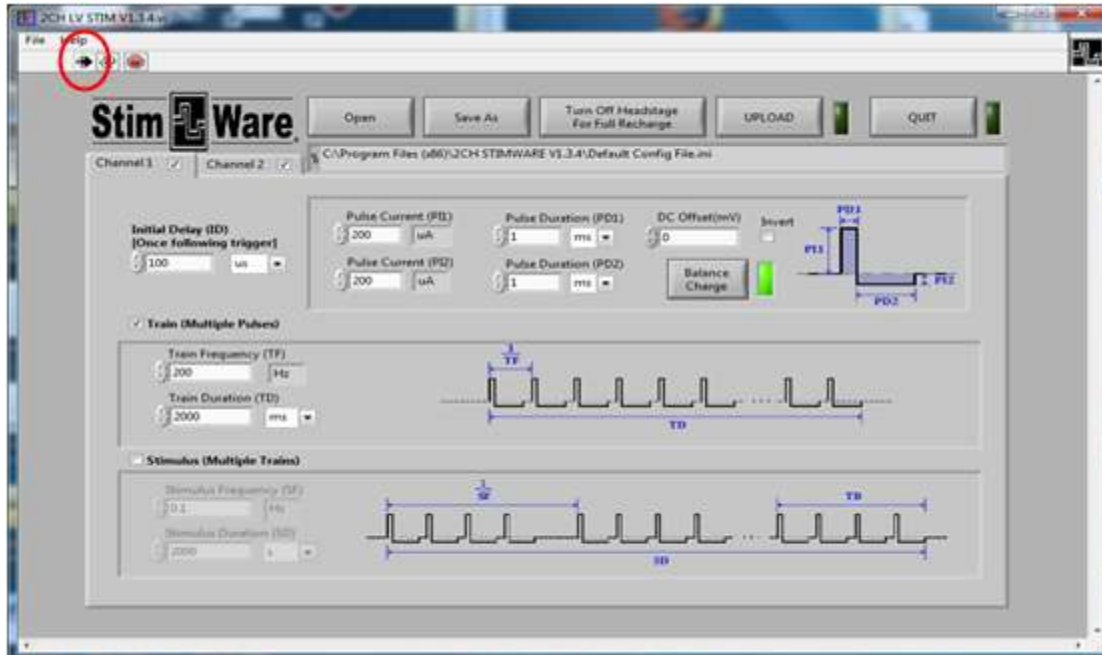
### ◆ StimWare™ Installation

To install and run StimWare™:

1. Insert the StimWare™ installation disc into your computer. Navigate to the *2CH STIMWARE V1.3.4 Installer* folder within the installation disc and double click **setup.exe**, then follow the prompts until installation is complete.
2. Plug the USB cable to both the PC and the headstage hardware. Windows will attempt to find a driver but will not and will pop up an error.
3. Right click on “My computer” and select “Manage” to open the Device Manager. If you do not have “My computer” on your desktop click the start button then right click on “Computer” and select “Device Manager.”
4. The headstage will be indicated by a yellow question mark (unidentified device). Right click the unidentified device, select “update driver software”, then “Browse my computer for driver software”. Map to The driver **EFM32-Cdc.inf** located in the “driver” folder on the installation disk. Follow the driver installation procedure until complete. The headstage should now be indicated by “EFM32-Cdc” under “COM and LTP”.

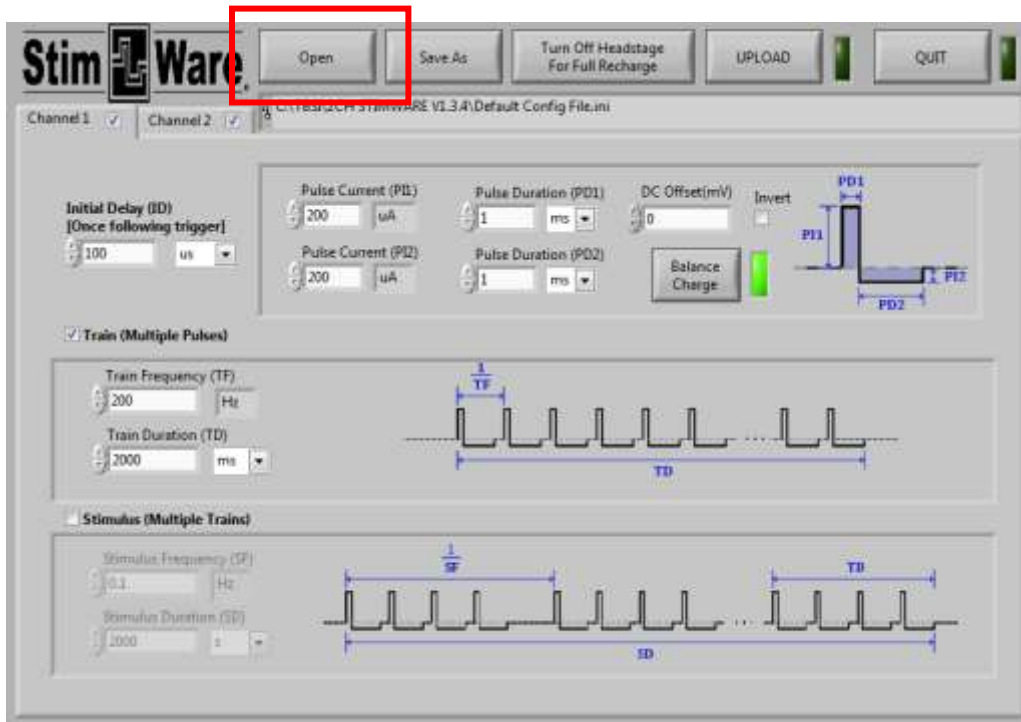
## Software Navigation

Launch the StimWare software application. StimWare is in 'Run' mode once launched.



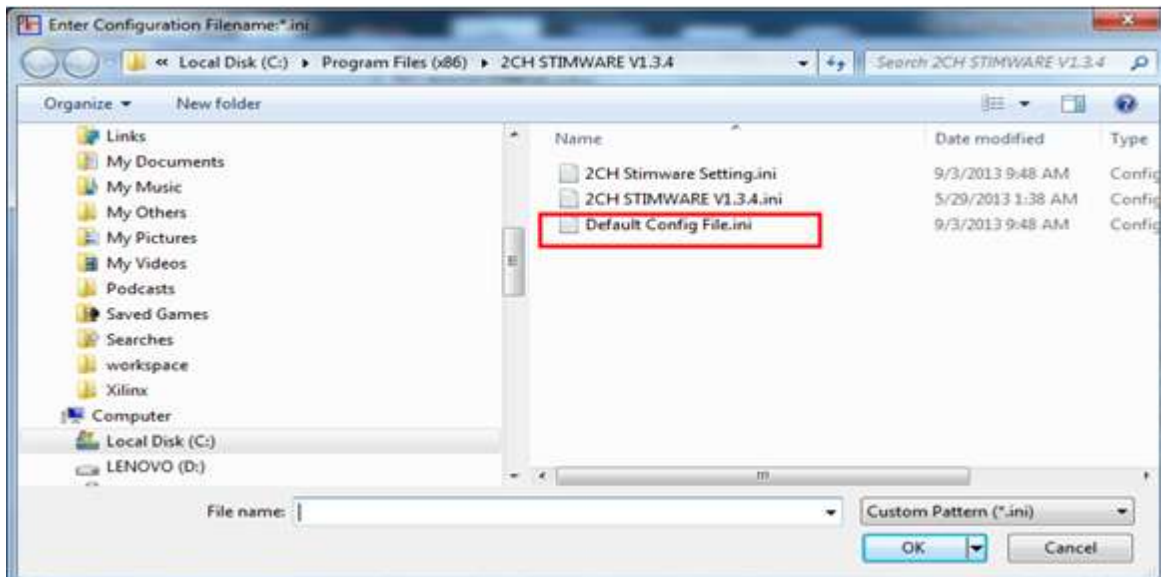
## Loading/Saving Configurations

Click the “OPEN” button to Explore config files.



Default parameters are loaded into StimWare from the configuration (.ini) file located on your computer:

→ *C:\Program Files (x86)\2CH STIMWARE V1.3.4*



Customized pattern parameters can be saved by pressing the 'Save As' button. The new configuration file, by default, will be saved to *C:\Program Files(x86)\2CH STIMWARE V1.3.4*



## Programming the Stim Channels

The two stim channels can be enabled and programmed separately from each other. To enable a channel, select the checkbox next to its name. A channel that is unchecked will not output any signal, so it may be advantageous to disable an unused channel to conserve battery life.



The graphics in the StimWare interface are intended as conceptual references and do not reflect the actual pattern set by the user-defined parameters.

The Initial Delay (ID) will be executed once at the start of the pattern.

By clicking the Balance Charge button, the software will verify and/or balance the current of the individual pulses. Checking the Invert box will change the polarity of the entire signal. To enable higher order tiers, check the box next to its name. Keep unused tiers disabled if they are not in use.

Certain parametric limitations are programmed into the software to ensure signal consistency and prevent saturation of the headstage amplifiers. If a parameter has exceeded its allowed range (ex. a frequency is set too high in a higher order tier), it will automatically be reset to its highest allowed value. **PI1 and PI2 can't exceed 1000uA. PD1 and PD2 can't be lower than 50uS.**



## System Setup and Testing

Below are instructions to verify pattern transfer to the headstage and signal output:

### 1) Connect headstage to computer via USB cable

Open the StimWare program application. If the headstage is successfully recognized by your computer, the top indicator LED on the front of the headstage will alight green.

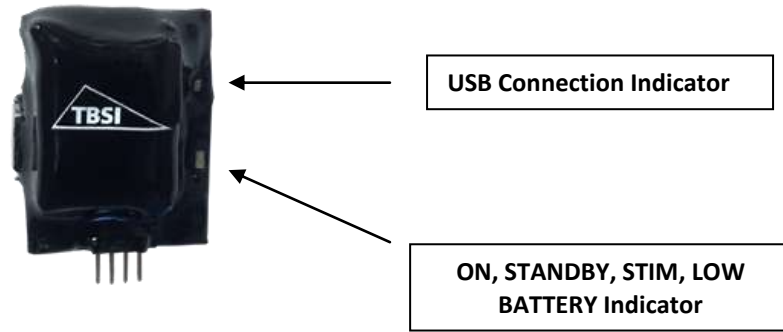
### 2) Generate and upload pattern in StimWare

Choose the stim signal parameters you wish to upload to the headstage. (Refer to the **Software Navigation** section of this document for more pattern programming instructions.) When finished, click the UPLOAD button to send the pattern data to the headstage (this will take no more than a split second to upload). Disconnect the headstage from the computer after uploading. The headstage will be in sleep mode upon disconnecting.



### 3) Activate and view stim pattern

The bottom LED on the front of the headstage will blink yellow once if it is on and twice if it is in standby mode. There will be a 5 second pause between the single or double blinks. Use the magnetic wand to turn on the headstage. To do this, briefly hold the 'ON/OFF' tip of the wand next to the front of the headstage. Use the 'STIM' tip of the wand to activate the uploaded stim pattern – you will see the bottom LED light up yellow for two seconds if the stim pattern has started executing successfully. Confirm the signal shape coming out of the headstage with an oscilloscope or similar device. The entire pattern will execute once, and then the headstage will go into standby mode.

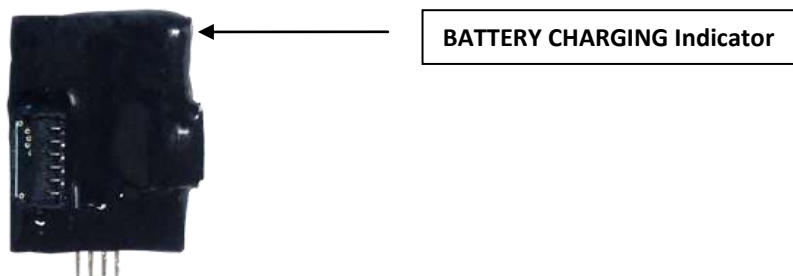


## Application Notes

### Charging the Headstage Lithium Ion Battery

The wireless stimulator headstage includes an integrated rechargeable battery which should be recharged when not in use. Recharging is accomplished by the following procedure:

1. Connect the headstage to your computer using the included USB cable.
2. Execute the StimWare software, then click the Charge Battery button.
3. The indicator LED on the back side of the headstage will alight red when the battery is charging but not full. The LED will change to green when the battery is fully recharged. A completely drained battery will become fully charged in an hour.





## LED Headstage Option

Red, blue and green mountable LED options are available for the 2 channel stimulator headstage. The LEDs are placed facing upward on the top of the headstage and are bright enough to allow for most video tracking applications. The LEDs will turn on with the headstage is turned on. Installation of LEDs on



## Electrodes

Microprobes Inc., NeuroNexus, Neuralynx and CD Neural Technologies offer a variety of electrode arrays that connect to all of our headstages.

## Troubleshooting

**Problem:** The headstage won't turn on. No LEDs light up.

**Suggestion:** Charge the battery via the USB cable provided with the system. Refer to the section titled **Application Notes** for charging instructions.

**Problem:** One or more output signals are missing or incorrect.

**Suggestion:** Reupload the stim signal parameters to the headstage with StimWare, making sure to follow all instructions within this manual. Check to make sure that the channels are enabled within the software prior to uploading. Check all equipment used to monitor the signal to ensure continuity.

**Problem:** The LEDs are lit on the headstage but it will not output a signal when touched with the magnetic wand.

**Suggestion:** Make sure the 'STIM' tip of the wand is being used to activate the stim signal.

Call TBSI customer support at (919) 361-2663 if there are any problems with system setup and function. You can also submit a Technical Issue report on our website [here](#).

## Document history

- 1.0 Initial release with Specifications
- 1.1 Removed Specifications, Added cover page 8/2013
- 1.2 Updated output pinout, added mating connector part number 9/2013