

BrainMaster StimFlash Software

Installation and Operation Manual

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Patent pending

User Instructions for BrainMaster StimFlash Software

1. Introduction

This manual provides information for the installation and use of the BrainMaster StimFlash system. This system is used to provide controlled photic stimulation in conjunction with EEG recording. It makes it possible to do the following:

- Select the frequency of flash stimulation.
- Operate the light glasses in "standalone" mode
- Choose how the flashing is controlled by EEG parameters.
- Operate the light glasses in conjunction with the BrainMaster EEG system.

The BrainMaster Flash system is intended for a variety of uses. It is up to the user to determine their requirements, and to use the system in the desired manner. This system is not provided with any specific recommendations or claims regarding its usefulness in specific situations. This system is considered investigational, and should be used with the user's understanding of the possible value and risks associated with using visual stimulation for specific purposes.

Note about compatibility:

This system supports light stimulation devices that are compatible with the AudioStrobe interface. This allows the glasses to be controlled by the sound output of your PC, when using the BrainMaster StimFlash software. Compatible devices include the Photosonix Nova Pro 100 and InnerPulse, the MindPlace/Synetics Orion, Sirius, and Proteus, and the MindGear PR-2X and TurboSonix. All of these devices include an input that can be connected to the sound card of your PC, to provide EEG-controlled photostimulation for training.

NOTICE

For Investigational use only

WARNING

This device should not be used by persons with epilepsy or any seizure disorder. Discontinue use if headaches, nausea, or other discomfort are experienced.

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2. Installing the Software

If you have installed the BrainMaster 2.5 software, StimFlash is already included. You will find the program icon in the “Extra Software” control accessed via the “Window” button on the training screen. If you are using the BrainMaster 2.0SE software, you can install the StimFlash from the floppy disk provided, or from a file that can be provided to you by email, or the web. The StimFlash software can be found at the web site:

www.brainmaster.com/software/stimflash

Once installed, the software, is run by clicking on the icon as shown:

If the StimFlash software is authorized, the control panel will appear as shown in the Operation section below

If the StimFlash software is not authorized, you will see the following message:

This indicates that the StimFlash software has not been authorized on your system. Contact BrainMaster Technologies, Inc. for information regarding activating your StimFlash system.

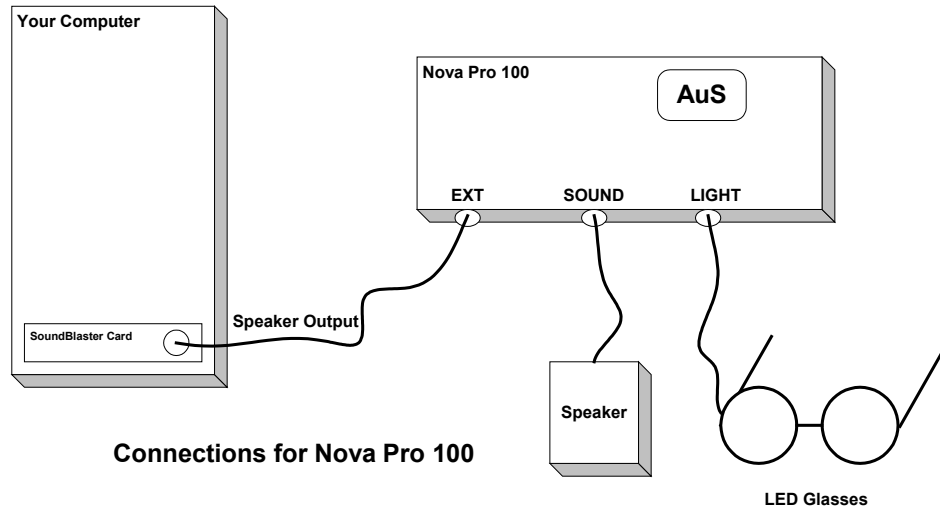
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3. Installing the Hardware

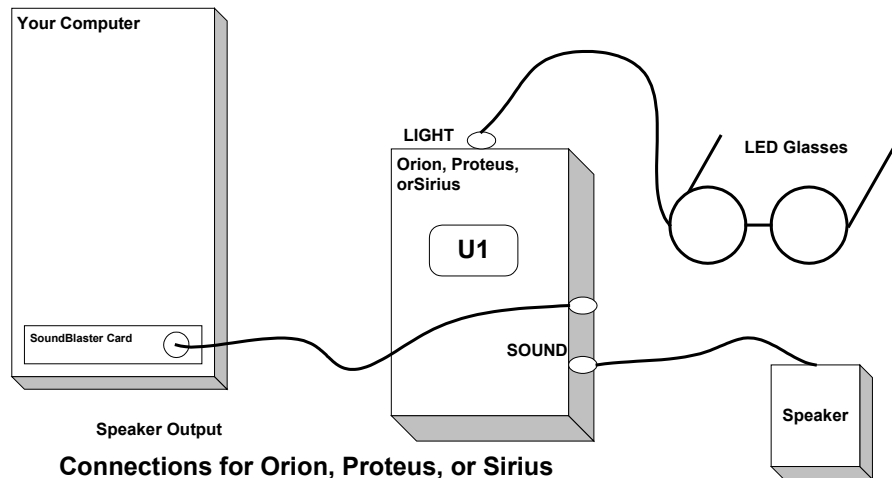
This section will show you how to install the L/S system on your computer. This is the standard installation. This section also provides detailed drawings of how to hook this up. IN the description that follows, “L/S module” refers to your Light/Sound device, e.g. Nova Pro 100, Inner Pulse, Orion, etc.

The drawings below illustrate the recommended connections:

- Remove the speaker cord from the back of the speaker and plug it into the jack labeled **EXT** or showing a picture of headphones on the **L/S** module.
- Find the patch cord provided with the **L/S** system and insert one end into the jack labeled **SOUND** or **INPUT** on the **L/S** module.
- Plug the other end of the patch cord into the sound output of your PC.
- Finally, plug the cord from the glasses, also provided, into the jack labeled **LIGHT** or showing a picture of the light goggles.



X

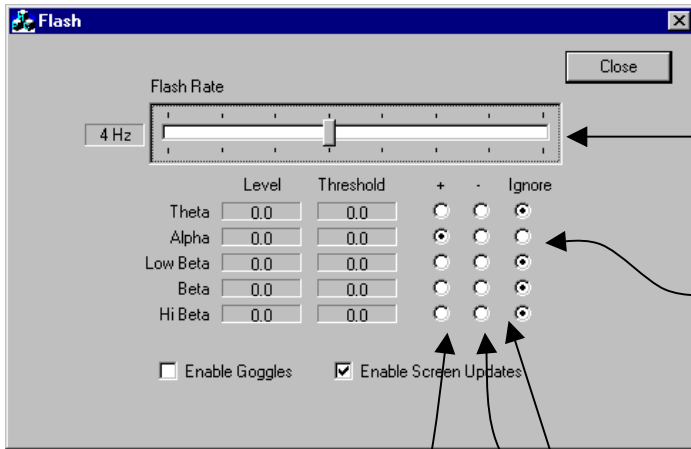


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3. Operation

As stated above, this system is very flexible, and can be used for a variety of uses. The general method of operation is explained below, and some possible uses are described.

The StimFlash control console, shown below, allows the user to vary the flash rate of the LED's and to select which EEG frequency components are used to control the flashing.



The flash rate of the LED's can be varied from 1 Hz (flashes per second) to 20 Hz, in 1 Hz increments

In this example, Alpha is being used to turn on the stimulation, while all other components are being ignored.

The user's selection of the plus (+) column or the minus (-) column determines how the related EEG component is used to control the glasses. If the radio button in the plus column is selected, the Flash software will flash the LED's when the related component is above its threshold. The opposite is the case when the minus button is selected -- the LED's will be flashed when the related component is below the threshold. In the above case, the LED's will flash when the Alpha component is above its threshold.

A special case is observed when all the EEG levels are set to **Ignore**. The LED's will be flashed continuously at the selected flash rate when the goggles are enabled.

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3.1. Continuous Operation

The system can be operated continuously as a simple photic stimulator controller, providing a specific frequency of stimulation. When used in this manner, the EEG is not used as part of the control loop. To operate in continuous mode, use the following procedure:

- Run the StimFlash software from the BrainMaster system as described above
- Select the desired Flash Rate
- Set all of the EEG components on "Ignore"
- Turn on the Photic Stimulation device.
- Select the AudioStrobe Mode:
 - Nova Pro 100: Press the down-arrow twice, so that "AuS" shows in the LED window
 - Orion, Sirius, Proteus: Press the "U" button once so that "U1" shows in the LED window
- Select "Enable Goggles"

The goggles will then flash at the desired rate. You can adjust the flashing rate from the StimFlash control panel, to change it up or down as required.

3.2. EEG-Controlled light stimulation

When used in conjunction with the BrainMaster EEG system, the Flash system will automatically read the current EEG data in real time from the BrainMaster system. In this case, you will be able to have the light glasses turn on or off under control of the EEG signal, providing powerful training possibilities.

To ensure that the EEG is being read correctly, check the "Enable Screen Updates" selection, and then operate the BrainMaster EEG. You should see the values of the components (Theta, Alpha, Low Beta, Beta, and High Beta) showing in the Level window. These levels should reflect the current values of the EEG amplitudes, and agree with the levels shown in the "Thermos" screen, for example. In addition, as you set the thresholds using the BrainMaster system, you should see the thresholds displayed in the StimFlash control panel change to match. This shows that the EEG values are being read correctly by the Flash system.

The Flash control system uses the BrainMaster EEG component amplitude values and thresholds. It operates independent of the BrainMaster's own reward (sound and points) system. It is possible to use both systems simultaneously, if desired.

You may notice a small amount of "clicking" in the headphones or speakers when each flash occurs. Adjust your volume and/or tone controls so that this is as small as possible, while still keeping the ability to hear the desired sounds or tones.

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4. Suggested uses (investigational only)

4.1. Alpha "training wheels"

There are reports that light stimulation in the alpha range can help the brain to learn to produce alpha waves. Based on this work, it is possible to use this system to experiment with alpha "entrainment" using EEG-controlled stimulation. Set the StimFlash software so that alpha is on the (-) selection, and all others are ignored. Set the goggles to flash at 8 flashes per second. Using the BrainMaster software, set the alpha threshold at a level determined by your EEG. A suggested level would be 3 to 8 microvolts. Place the EEG electrodes in an appropriate location such as O1, Oz, or O2, with an ear reference and ground. When the goggles are enabled, there will be flashing as long as the alpha level is below this threshold. When the goggles are put on, the EEG will begin to show alpha activity. When enough alpha activity appears, the goggles will then turn off. This allows the user to have the goggles flashing as a start to producing alpha activity, then turn off as alpha is produced. When the goggles then turn off, the user is able to produce their own alpha waves, and the attendant relaxation. If the alpha drops below the threshold, the goggles will again turn on.

4.2. Theta Reducer

The StimFlash can be used to reduce the production of theta waves in trainees who are experiencing difficulty reducing theta amplitude. Set the goggles to flash at 12 flashes per second, and select the "+" control next to the Theta label. The goggles will flash whenever the trainee's theta goes above its threshold. Set the theta threshold manually, or using autothresholding, to be above threshold approximately 50% of the time.

NOTE: This application is patent pending

4.3. Muscle relaxer

The StimFlash system can also be set up so that the alpha goggles turn on when the user is producing muscle activity, indicating tension. Set the Flash software with a (+) in the "Hi Beta" component, ignoring others. Place electrodes above the jaw (T3 or T4) with ear reference and ground. Set the beta threshold at a reasonable level, such as 5 to 10 microvolts. The goggles will normally be off. When the EEG signal produces significant High Beta, indicating muscle activity, then the goggles will turn on, helping to produce a relaxed state. This can thus be used as an EMG biofeedback system, in which the feedback signal produces relaxation.