# BrainMaster Interactor Cushion
# Or Vibrotactile Toy

# Installation and Operation Manual

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# User Instructions for Interactor Cushion or Vibrotactile Toy with BrainMaster Software

## 1. Introduction

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

- Make the cushion vibrate.

- Choose how the vibration is controlled by EEG parameters.

- Operate the cushion in conjunction with the BrainMaster EEG system.

The BrainMaster Interactor Cushion 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 vibratory stimulation for various purposes.

There are three basic ways to use the Interactor Cushion or toy with the BrainMaster Software. We recommend methods 1 or 2 for beginning users.

(1) Use any protocol that produces "Reward" sounds, and select a sound like "Space" which will produce a vibration that can be felt.  The sound will then follow whatever protocol is in use. No special software is required.

(2) Use any protocol that produces "MIDI" sounds, and select a voice like "Oboe" or other deep sound that will produce a vibration that can be felt.  The sound will then follow whatever protocol is in use.  No special software is required.

(3) Use the Interactor Cushion software to control the device with its own protocol.  (see below)

NOTE: You can use the cushion or toy without installing the special software described below. The Interactor software is intended to allow the cushion to have its own separate protocol, when desired.  You can use the cushion or toy for vibrotactile feedback simply by using Reward or MIDI sounds with any standard protocol, and using the cushion for feedback.

**Note about compatibility:**

This system may be operated with the Interactor Cushion manufactured by Aura Systems, Inc, Neuro the Tactile Bear from EEG Support, Inc., and similar devices.

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## 2. Using the Interactor Cushion Software

The software is already installed.  Use this procedure only if you need to use the special Interactor Cushion software.  The Interactor software is built into the 2.5SE and 3.0 Software.  To access it, first run the BrainMaster Training/Control screen.  Then press "Window", and then press "Additional Software (browse".

The Cushion software is accessible via. the browser using the icon labeled "Cushion"
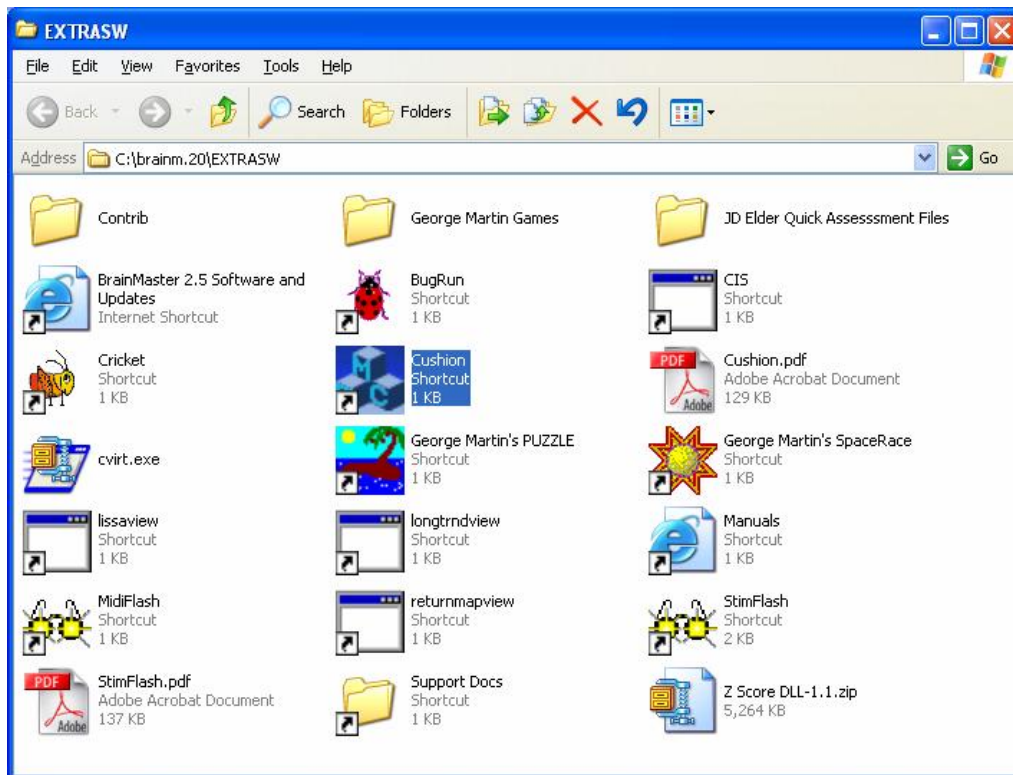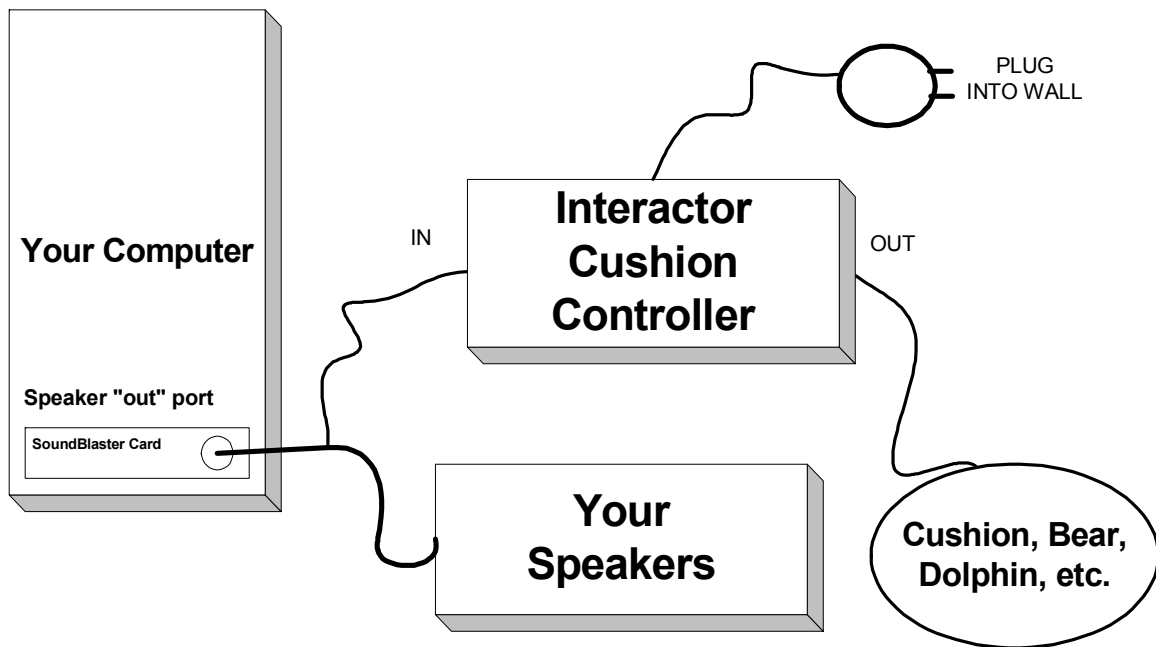


## 3. Installing the Cushion Hardware

This section will show you how to install the Interactor Cushion system on your computer.  This is the standard installation.  The next page gives detailed drawings of how to hook this up.

The drawing below illustrates the recommended connections:

- The power cable has 110VAC on one end, and a multipin connector on the other.
- Plug the Interactor Cushion control into the wall outlet using the power cable.
- The Interactor Cushion has a cable built into it.
- Connect the Interactor Cushion control to the Cushion control "out" using the built-incable.
- The output cable has mini-phono jacks on both ends.
- Plug the output connector (mini phono jack) into the speaker output of your PC.
- Plug the other end of the output cord into the "in" connector of the Cushion control.

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  ┌──────────────┐                                   \____/
  │Your Computer │            ┌─────────────────┐
  │              │     IN     │   Interactor    │   OUT
  │              │            │    Cushion      │
  │              │            │   Controller    │
  │ Speaker "out"│            └─────────────────┘
  │     port     │
  │ ┌──────────┐ │
  │ │SoundBlaster│           ┌─────────────────┐      ┌──────────────┐
  │ │   Card   ⊙─┼──         │      Your       │      │ Cushion, Bear,│
  │ └──────────┘ │           │    Speakers     │      │  Dolphin, etc.│
  └──────────────┘           └─────────────────┘      └──────────────┘
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# 4. 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.  If you get a message "Software is not authorized," contact BrainMaster Technologies, Inc.

### 4.1. Description of Cushion Controls

The Cushion control console, shown below, allows the user to "enable" the cushion, and to select which EEG frequency components are used to control the flashing.   The screen also displays the EEG values being read in from the BrainMaster software, to control the cushion.

This control screen appears when you run the program "Cush.exe" from the directory c:\brainm or from the shortcut you created.

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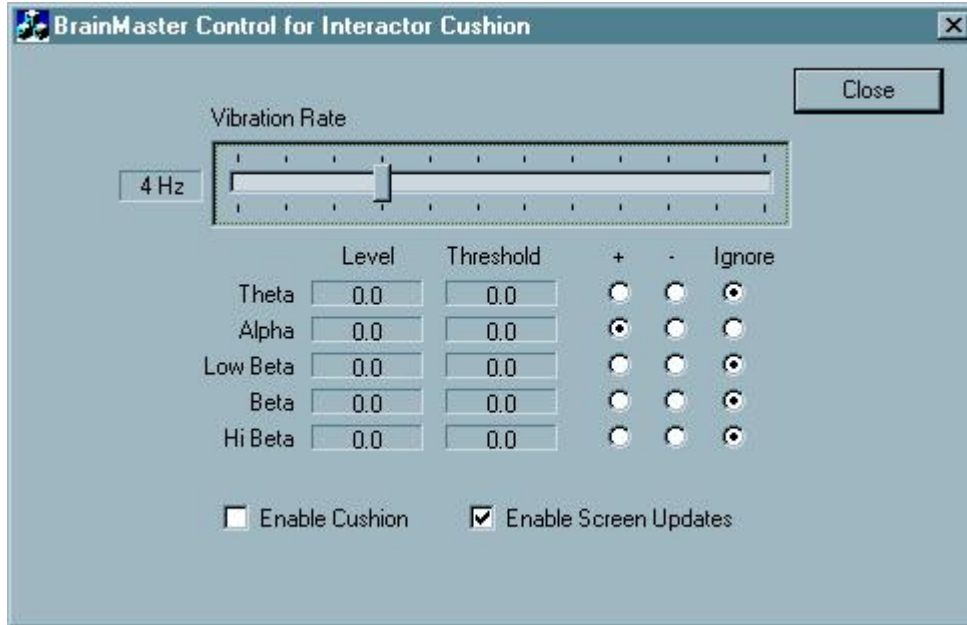


The "Vibration Rate" control sets the rate at which the cushion will vibrate. This can be set from 1 vibration per second, to 12 vibrations per second.

The "level" and "threshold" boxes show the values being read in from the BrainMaster software. These will be visible changing, if "Enable Screen Updates" is selected.

"Enable Cushion" allows the cushion to vibrate when the criteria are satisfied.

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

A special case is observed when all the EEG levels are set to **Ignore**. The cushion will vibrate constantly at the preset rate, when it is enabled.

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Direct Operation

The system can be operated "direct" as a simple vibrator, providing continual stimulation. When used in this manner, the BrainMaster EEG system is not used. To operate in standalone mode, use the following procedure:

- Connect and turn on the Interactor Cushion

- activate the Cushion software "Cushion.exe" using Windows Explorer, or your shortcut.

- set all of the EEG components on "Ignore"

- Select "Enable Cushion"

The cushion should vibrate. Make sure the "volume" and "filter" controls on the Cushion Controller (the black plastic box) are turned fully up (to 10).

## 4.2. EEG-Controlled vibration

When used in conjunction with the BrainMaster EEG system, the Cushion system will automatically read the EEG values out of the "DLL shared memory" area that is created and maintained by the BrainMaster system. IN this case, you will be able to have the cushion turn on or off under control of the EEG signal.

To ensure that the EEG is being read correctly, use 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. In addition, as you set the thresholds using the BrainMaster system, you should see the thresholds appear. This shows that the EEG values are being read correctly by the Cushion system.

The Cushion control system uses the BrainMaster EEG component 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.

## 5. Suggested (investigational only) uses

### 5.1. Alpha relaxer

This setup provides relaxing vibration, coupled to the user's alpha waves. Set the Cushion software so that alpha is on the (+) selection, and all others are ignored. Set the cushion to vibrate at 12 vibrations 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 cushion is enabled, it will vibrate whenever the alpha level is above this threshold. This allows the user to feel vibration when they are producing alpha wave, providing feedback and enhancing relaxation. If the alpha drops below the threshold, the cushion will stop vibrating.

### 5.2. Beta Reward

The system can be set up in a standard reinforcement protocol (enhancing beta or low beta) by having the cushion vibrate when that component is above threshold. This provides encouragement to the user, and an additional feedback path to the brain.

### 5.3. Theta Reducer

The system can be set so that when low theta (below threshold) is produced, the cushion will vibrate, providing a "pat on the back" for reinforcement. This may be helpful in neurofeedback protocols in which it is desired to lower the amount of theta energy in the EEG. A vibration rate of 10 to 12 per second is recommended.

### 5.4. Feeling the Motion

The system can be set so that the vibrotactile cushion provides a vibration that is exactly synchronized with the progress of the animation viewed, when using the BrainMaster AVI "Nfviewer" as visual training. The vibration provides a dramatic reinforcement of the animation, and also provides immediate, moment-to-moment feedback for every instant that the trainee is meeting training criteria. To use this mode, set the cushion vibration rate at 10 per second. Then set the cushion protocol to exactly match the protocol used in the main training screen. With these settings, whenever the trainee meets the training criteria, there will be thump on the cushion, exactly when the animation progresses a frame. The trainee can thus relax, and feel the vibration that reinforces the animation, providing synchronized visual and tactile feedback. This is a very dramatic and effective method, that will reinforce eyes-open training with responsive vibration.

### 5.5. Space Chair

The "space" sounds used by the BrainMaster 2.0SE or 2.5 software work well when put through the Interactor Cushion. When used as the standard "reward" sound, the space sound will play whenever the user wins a point. Putting the sound through the chair makes it tactile to the trainee, and adds an element of fun to the training session.