

Equipment & Program

For our experiments, a specialized EEG headset (Emotiv[®] EPOC Neuroheadset) is used. To transport and to analyze EEG signal data into the computer, Emotiv[®] Control Panel, BCI 2000[®] Cursor Task, BCI 2000[®] StimPresentation, and BCI 2000[®] Offline Analysis were used.

1) Emotiv[®] EPOC Neuroheadset

Table 1: Emotiv[®] EPOC Neuroheadset

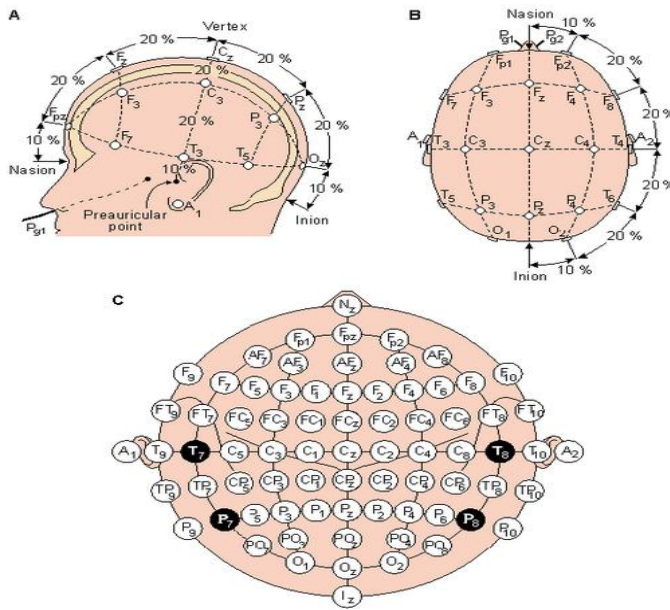
Emotiv [®] EPOC Neuroheadset
<ul style="list-style-type: none">• Emotiv[®] EPOC Neuroheadset• Emotiv[®] EPOC Neuroheadset Conductors• Emotiv[®] EPOC Neuroheadset Dongle• Saline• Computer with BCI 2.1[®]• Headset



-Understanding Electrode Placements

International standards for the placement of EEG electrodes, known as “10-20 International System of Electrode Placement” were set in 1959. The electrode locations for the 10-20 system are illustrated in Figure 20 A and B. Later, these standards were classified more specifically, with 53 possible electrode placements.

Start from top (or, center) of the head, every electrodes are placed either 10% or 20% away from each other in vertical and horizontal directions. Each location is named with a letter and number; the letter refers to the brain area over which the electrode is placed, and the numbers indicate which side of the head the electrodes are on (odd number → left hemisphere, even number → right hemisphere).



-Wearing Emotiv[®] EPOC Neuroheadset

1. Soak the Emotiv[®] EPOC Neuroheadset Conductors with saline.
2. Insert the soaked Emotiv[®] EPOC Neuroheadset Conductors into Emotiv[®] EPOC Neuroheadset.
3. Plug the Emotiv[®] EPOC Neuroheadset Dongle into the computer.
4. Turn on the Emotiv[®] EPOC Neuroheadset by sliding the switch at the top of the Emotiv[®] EPOC Neuroheadset.
5. Wear the headset as shown in Figure below. The electrodes must be placed on Fp1, F7, F3, A1, T3, C3, T5, P3, O1, Fp2, F8, F4, A2, T4, C4, T6, P4, and O2. The ground electrodes are on T3 and T4.

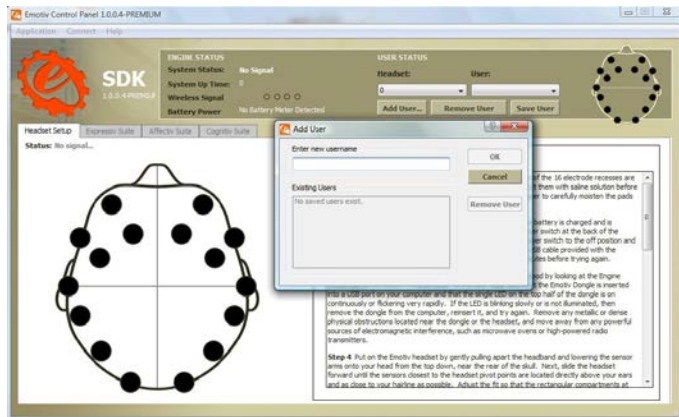


2) Emotiv[®] Control Panel

Turn on the Emotiv[®] EPOC Neuroheadset, and open Emotiv[®] Control Panel. Emotiv[®] Control Panel shows several real-time data for

- 1) Elapsed Time
- 2) Wireless Signal
- 3) Battery Power
- 4) Connection Status
- 5) Raw EEG Signals.

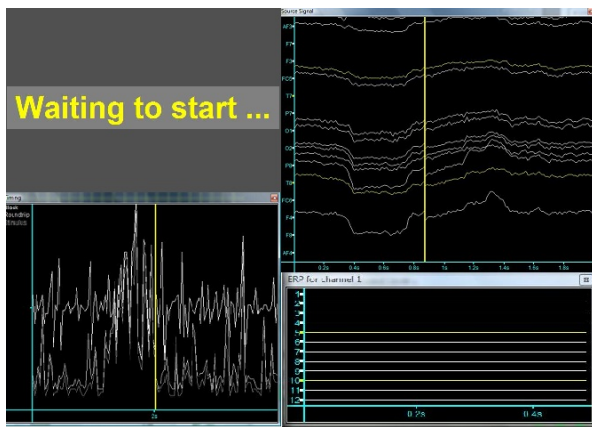
For the electrode connections, when a recording electrode is not in contact with skin, its site in the bottom left of the Emotiv[®] Control Panel is colored **Black**. When a recording electrode is in contact with skin, its site is colored **Green** (indicating an optimized connection), **Yellow** (indicating an adequate connection), **Brown** (indicating an inadequate connection), and **Red** (indicating a faulty connection).



3) BCI 2000[®]

- BCI2000[®] StimPresentation

StimPresentation is a measure of best correlations between real-time EEG signals into actual or imaginary body movements. From the configuration, we can decide what EEG signals of actions we will collect. By performing StimPresentation, we can acquire fundamental EEG data in the frequency domain.



- BCI2000[®] Cursor Tasks

Cursor Task is a measure of EEG signals in specific channel and frequency. It is required to examine degrees of variations in EEG signals in specific brain regions. Usually Cursor Task is performed after analysis of StimPresentation since StimPresentation analyzes the general characteristics of one's EEG signals.

