

Portable Electroencephalogram Biofeedback Device

PRODUCT DESIGN SPECIFICATION

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Function: The portable EEG (brain wave monitor) will take an incoming signal from a series of electrodes, amplify the signal to measurable and interpretable levels, filter out specific frequencies and present the occurrence of those distinctive brain waves in a manner applicable for biofeedback.

Client Requirements:

- A device that minimizes complicated user input (simplistic like an iPod)
- Final cost of \$100-200
- A type of biofeedback output that is not distracting to the user during meditation

Design Requirements:

Physical and Operational Characteristics

- Performance: Device should be able to be used for a minimum of two hours on a single battery charge, with the possibility of daily use.
- Aesthetics, Appearance, and Finish: Device should be minimally complicated visually, with an interface similar to that of portable music players (such as an iPod). The shape should be rectangular, and colors should be pleasing to the eye without being distracting.
- Safety: Device should be free from danger of shock, and be appropriately labeled to warn of this danger as well as damaging interaction with electrical components.
- Size & Weight: Device should be portable and easy to transport.
- Accuracy and Reliability: Device should produce feedback accurate enough for qualitative analysis, not necessarily clinical applications.
- Operating Environment: Device should be able to be operated by one person, in reasonable indoor/outdoor conditions (not extremes such as in rain/bathtub), and be able to withstand the typical wear associated with accidents and everyday use.
- Materials: Should incorporate a maximum number of reusable parts.
- Life in Service: Device should last a minimum of 5 years.

Production Characteristics

- Quantity: The portable EEG will be relatively mass-produced for consumer delivery.
- Target Product Cost: \$100 - 200, compared to commercial versions ranging from \$1,000 – 5,000

Other Characteristics

- Standards and Specifications: Meets national standards for electronic devices, as well as FDA requirements (Level 1 or 2?).
 - Customer: Device should be conducive to a meditative environment (comfortable, a user-friendly, simple interface)
 - Patient-related concerns: Preparation of the electrodes may be extensive, requiring daily cleaning, and eventual replacement.
 - Competition: Should be able to produce comparable signal quality and feedback for a lower price, smaller packaging, and no necessary training.
- N.B. A patent search found a similar device using rapid LEDs as the feedback mechanism.*