Product Design Specifications

ERG Recorder 10/21/08

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Function: Electroretinogram (ERG) is the measurement of voltage across the retina in response to light flash. This project's goal is to create a system controlled through LabVIEW to monitor, control, and record values from an ERG corresponding to liquid exchange, light intensity, flash duration and frequency, as well as the waveforms.

Client requirements:

- Filter number, corresponds to the light intensity
- Flash duration (in ms)
- Sample duration (in ms)
- Noise reduction (averaging data)
- Reset clock (timestamps)
- Liquid delivery through valve control of up to 8 different solutions
- Checkpoints in graphs for later analysis
- Export data to Excel for further analysis
- Animal testing may be performed
- Recording of a-waves, b-waves, and slow-waves

Design requirements:

1. Physical and Operational Characteristics

a. Performance requirements: Used daily on a Windows platform. It will likely be used by itself so RAM and processing power is not an issue. Delivery of one, and only one, liquid into the testing environment at a time.

c. Accuracy and Reliability: The interface is as accurate and precise as the selected programming environment is on the chosen operating system.

d. Life in Service: The software program should run without modification until the data acquisition hardware is changed.

e: Operating environment: The system should be functional in a Windows environment.

f: Ergonomics: The user interface on the computer should be intuitive: Items displayed should be easily understood with consistent formatting and a clean interface.

g. *Materials*: Windows-based computer with LabVIEW 7.6 installed.

h. *Aesthetics*, *Appearance, and Finish*: The program should be easy to use and functional with the following considerations:

- Text easily readable
- Contrasting Colors
- Intuitive Organization
- As simple as possible without dropping features

2. Production Characteristics

a. *Quantity*: One interface that could be shared by multiple labs

b. *Target Product Cost*: Software and hardware have already been purchased so no additional costs should be incurred.

3. Miscellaneous

a. *Standards and Specifications*: This project will not need to conform to FDA standards, as human testing is not going to be performed. It is necessary, however, to follow the RARC (Research Animal Resources Center) for animal testing.

b. *Customer*: The client would like to use a system in a Windows environment.

c. *Competition*: Our system is intended for research and there are no patents covering the scope of this project. There are some software solutions that have similar capabilities:

- CSH Protocols has developed a protocol for progressive ERG measurement during the development of larval zebrafish noninvasively. <http://cshprotocols.cshlp.org/cgi/content/abstract/2008/4/pdb.prot4973>
- VERIS EDI software is Macintosh based and has protocols for mfERG and transient ERG recording. Their software provides data analysis and storage capabilities but does not interface with the additional components (valves, etc.) that the client desires. <http://www.veris-edi.com/>
- AD Instruments LabChart Software is a data acquisition solution that, when combinied with LabScope, offers powerful data analysis techniques. This software does not provide the hardware interface to communicate with valves or record other settings such as the light wheel. <http://www.adinstruments.com/products/software/research/LabChart-Software>