Engineering Design Constraints
EE 4811.001
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November 1, 2006

Team 3
Design Constraints

Global Constraints

1) Engineering Codes and Standards
   Codes and standards help ensure quality and safety. Our end result will need to abide by these standards.

2) Economic Factors
   Effects of increases or decreases in potential sales will not have an effect because the current design plan is a private request which does not include broad sales or marketing.

3) Environmental Effects
   The manufacturing and use of the design will not have environmental effects; however, the disposal of the product may. This will largely depend on our final source of power for the microcontroller.

4) Sustainability
   The product will not have the market to be effectively sustained on a long term basis. A company that services the obsolete product may be offered the final design enhancement as a product enhancement for them to sell.

5) Manufacturability
   From a global perspective the product will not be effectively manufactured. The product serves to benefit a very narrow market that will not require a large manufacturing demand. Local manufacturing should suffice.

6) Ethical Consideration
   Currently no potential ethical issues exist because the design modifies an existing product. The modification focuses on A/D and D/A conversions and interfacing.

7) Health and Safety Issues
   Designing and testing to current standards prevents the product from posing any health and safety issues.

8) Social Ramifications
   The consumption of the product has the potential to positively affect the social well-being of society.

9) Political Factors
Current plans exist to use the product in Honduras. International relations and laws will have to be reviewed to ensure its use does not create any political issues.

10) Legal Issues
    Currently no patents have been found that employ the design approaches the team is considering. During the progression of the design constant care will have to be taken to ensure patents held for similar product results are not infringed upon.

Local Constraints

1) Cost
    No direct cost constraints exist because the cost of development will be covered by the gentleman requesting the design.

2) Schedule
    Schedule constraints do exist. The design must be completed and constructed by May 2007.

3) Manufacturability
    Manufacturability constraints exist because the original specifications of the obsolete product have not been located. Development of the new product relies on specifications from the obsolete product because it will be modified.

4) Engineering Codes and Standards
    Testing codes and standards exist that will constrain the development and manufacturing of the product.

5) Ethical Considerations
    No ethical considerations from within the company currently exist because of the scope of the design.

6) Health and Safety Issue
    Much care will have to be given to safety and health issues because the specifications for the obsolete product are not yet obtainable. Any modifications will have to be designed to current to standards and ensure safe operability of the obsolete product.

7) Legal
    Legal safety concerns exist because the users may not be familiar with the equipment and many product specifications have to be determined without prior design specifications.
**User Requirements**

1) Computer necessary to run software user interface
2) USB 2.0 adaptors for downloading
3) The device must be portable
4) The system must be easily usable by English and Spanish speakers
5) The device must be able to communicate with the interface up to 100 ft. away
6) The data must be easily imported to an excel file
7) The system must be completely controllable by a laptop

**System Requirements**

1) The system must convert 12 analog signals to digital signals
2) The analog device must remain operable
3) The microcontroller will have a separate power supply
4) Need 10 bit A/D and D/A on board converter
5) 64k memory for driving multiple slave devices (sensors, etc.)
6) Asynchronous interfacing for realizing 12 simultaneous channels in real time.
7) Sampling rate with a minimum of millisecond sampling capabilities
8) System must be weather resistant
9) System must be operable
10) All original analog functionalities must be digitally reproducible

**Interface Requirements**

1) Must have a serial connection from the seismograph to the microcontroller.
2) Microcontroller must interface with a USB to a laptop
3) Software must interface with microcontroller