

Product Design Specifications—Digital Braille Watch

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Problem Statement:

In order to determine the time, the visually impaired currently depend on talking or tactile analog watches. However, talking watches are disruptive, while the tactile analog watches are difficult to read and fragile. Our client desires a device that uses the standard Braille number system to display the time. This device should be fabricated using metal parts, have a self-contained power supply, use standard Braille spacing, and be of a standard wrist-watch size.

Client Requirements:

- Digital time display using Standard Braille Spacing
- Silent and without vibrations
- A functioning prototype that the client can use on the daily basis

Design Requirements:

1) Design Requirements

- Performance requirements:* See Client Requirements above, in addition to being self-contained, using standard Braille spacing, and of sufficient size. The battery should last at least a month and should be rechargeable
- Safety:* All electronics must be contained and the watch must not contain hazardous materials. In order to ensure the user is not harmed in any condition, no component of the part should be unsafe
- Accuracy and Reliability:* The watch must accurately display military time within the minute for the duration of its life
- Life in Service:* The watch must be able function continuously using a self-contained power source for at least five years
- Shelf Life:* Similar or superior to audible or tactile watches in the market
- Operating Environment:* The device must be able to operate reliably in a dry environment without being affected by perspiration
- Ergonomics:* The watch should not contain rough edges or loose components and the display surface should be easy to read. The watch should not make its user aware of the fact that he/she is wearing something on his/her wrist.
- Size:* The prototype should have a display area of less than 50x50 mm and a height of less than 25mm
- Weight:* Less than 500 grams
- Materials:* The device must comprise of non-toxic metal components
- Aesthetics, Appearance, and Finish:* The watch should be aesthetically pleasing

2) Product Characteristics

- a) *Quantity*: One working prototype
- b) *Target Product Cost*: \$100 or less when mass-produced

3) Miscellaneous

- a) *Standards and Specifications*: Must display time according to the standard Braille language
- b) *Customer*: The customer would like a device that physically displays the time using Braille technology
- c) *Patient Related Concerns*: None
- d) *Competition*: Audible and tactile analog watches are commercially available for the visually-impaired