Autobed: Open Hardware for Accessible Web-based Control of an Electric Bed

**Overview**

Electric bed controls may be inaccessible to users with severe motor impairments

- Individuals with severe motor impairments may spend significant time in bed
- Electric hospital beds reconfigure to:
  - Increase user comfort
  - Reduce likelihood of pressure ulcers
- Many electric bed controls use physical buttons that may be inaccessible to users with severe motor impairments

The Autobed enables accessible web-based control of an electric hospital bed

- Connects between bed's control remote and motor control box
- Provides control of bed functions in a modern web browser
- Accessible to motor-impaired individuals who can use a computer

**System Description**

Autobed enables web-based control of an electric bed using low-cost open hardware and open software

- Connects between control handset and bed motor controller
- Serves a web-based Graphical User Interface (GUI) to users on the local network
- Activates bed motors using a custom opto-isolator switching circuit
- Allows the remote pendant to continue working, even when Autobed is off

Open-source design: Hardware, Software, Build Instructions

**Evaluation**

Henry Evans, a user with severe motor impairments, used the Autobed successfully over 102 days

**Questionnaire Responses**

Henry and Jane Evans (Henry's wife and primary caregiver) both agreed:

- Henry used the Autobed often
- The Autobed is reliable
- Autobed makes Henry more independent

**Low Effort for Caregiver**

“I don’t interact at all with the Autobed except if a wire becomes loose” – Jane Evans

**Quotes from Henry**

- “[the Autobed] prevents me from lying in pain until my caregiver arrives”
- “Maximizes my productive time”
- “It has become part of my life. I love it.”

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