User Controls Block

ECE441 Wearable Sensor for the Blind Project

Samuel Jia Khai Lee

ECE Senior Design

Oregon State University,

Corvallis, OR USA

leejiaks@oregonstate.edu

Keywords—User Controls; switch; block description; design verification

# Introduction

The purpose of this document is to describe the Bluetooth block of the ECE441 Wearable Sensor for the Blind project to 4th year ECE students with the intention of these students being able to build and verify the block without further research. The User Controls block is implemented using a DP3T toggle switch for the system sensor module and a SPST toggle switch for the system feedback module. This document provides an overview of the overall block function including interface properties and a schematic, verification for the design in the form of a step-by-step testing process, and support for the validity of the design in the form of outside research and numerical justification addressing individual properties.

# Design Details

The wiring diagram (Fig.1) presents the block design, including the interfaces of the block. These interfaces are further elaborated through validation information given in Table 1, which demonstrates externally-supported validly for each of the block’s properties.

1. Black Box Diagram of Bluetooth Block

# Block Overview

The User Controls on the system sensor module and the system feedback module indicate which mode to power the system. The block gets input from **otsd\_usr\_cntrls\_usrin** interfacethrough the lever on the switch. Fig. 2 shows the black box diagram. The **usr\_cntrls\_pwr\_spply\_usrin** interface determine if low power mode is chosen for the system sensor module while the **usr\_cntrls\_pwr\_pply\_usrin** powers the system. This block is completed by Samuel Lee.   
  
A full listing of interface properties can be found in Table 1.

usr\_cntrls\_pwr\_spply\_usrin

User Controls

otsd\_usr\_cntrls\_usrin

usr\_cntrls\_cntrllr\_cd\_usrin

1. Black Box Diagram of User Controls Block

`

| Interface | Properties |
| --- | --- |
| **otsd\_usr\_cntrls\_usrin** | 1.Interface Type: Physical Switch  2.Power switch for system sensor module: off - on - low power  3.Power switch for system feedback module: off - on  4.Knob for system feedback intensity  5.Battery compartment |
| **usr\_cntrls\_cntrllr\_cd\_usrin** | 1.Power switch: Low power (active high) |
| **usr\_cntrls\_pwr\_spply\_usrin** | 1.Power switch: On Off |

1. User Controls Block Interfaces and Properties

# Block Verification

Based on the interfaces for this block, a verification (testing) process needs to be indicated. This will allow the final constructed design to be tested verifying that all the interface properties have been met and that the block is ready for integration into the system.

If the block passes all the listed tests, all interface properties have been verified and the block is ready for inclusion into the system.

# Design Validation

For this block, an off the shelf solution was chosen. The DP3T toggle switch and SPST toggle switch fit the needs of the block interfaces. Table 2 includes the interface property validation for this block. All the interface properties have been addressed and the design meets or exceeds the properties.

1. Interface Property Validation for the User Controls Block

# Bills of Materials

Table 3 lists the bills of materials used for the Bluetooth block.

| Item | Price | Link |
| --- | --- | --- |
| DP3T Toggle Switch | $14.39 | [Link](https://www.digikey.com/product-detail/en/nkk-switches/M2044SD3W01/M2044SD3W01-ND/2105888) |
| SPST Toggle Switch | $1.95 | [Link](https://www.sparkfun.com/products/9276) |

1. Bills of Materials for the Bluetooth Block