3D Wireless Mouse

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General Overview

- Wireless
- FPGA Calculations and Interfacing
- PS/2 Interface
Wireless Segment Block Diagram

Accelerometer
- x axis
- y axis
- z axis

Transmitter
- ADC
- CC1010

Receiver
- CC1010

Batteries

Lab Kit
- UART
LIS30L02 Accelerometer

- 3-Axis acceleration readings
- Radiometric analog voltage output
- 2g/6g range
- Evaluation board
CC1010 RF Transceiver and Microcontroller

- 3 Channel 10 bit ADC
- UART Interface
- FLASH programmer
- C-compiler and Library
- 868 MHz frequency band
Testing the RF Segment

- ADC outputs correct data
- Wireless kit can transmit data
- Wireless kit can receive data
- Wireless kit can interface with Labkit via UART
FPGA

- UART Interface
- Initialization
- Tilt rotation?
- Filter
- Integration
- PS/2 Interface
FPGA: Detail Block Diagram
PS/2 Mouse Interface

- Reads spatial data from accelerometer
- Translates data into mouse movement and click data
- Serializes mouse information into PS/2 format
- Reads and responds to host requests

## PS/2 Mouse data packet

<table>
<thead>
<tr>
<th></th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Byte 1</strong></td>
<td>Y overflow</td>
<td>X overflow</td>
<td>Y sign bit</td>
<td>X sign bit</td>
<td>Always 1</td>
<td>Middle Btn</td>
<td>Right Btn</td>
<td>Left Btn</td>
</tr>
<tr>
<td><strong>Byte 2</strong></td>
<td>X Movement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Byte 3</strong></td>
<td>Y Movement</td>
<td></td>
<td></td>
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Device to Host Communication

Host to Device Communication
Timeline

- Mon, Apr 25: Wireless communication
- Fri, Apr 29: FPGA calculation, PS/2 interface
- Wed, May 6: Complete Integration
- Fri, May 8: Tilt translation?