EECS373
Design of Microprocessor-Based Systems

Dance Dance Revolutionized

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Introduction: Wireless Wearable Dance Dance Revolution Controller

Concept:

- **Create wireless controller for popular PC game “Dance Dance Revolution”**

Implementation:

- **Custom PCB based on SmartFusion chipset**
- **Accelerometer and Gyroscope to track foot movement**
- **Bluetooth to transmit event actions to play the game**

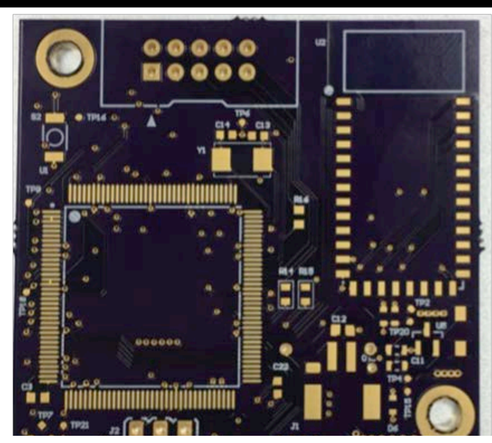
What Needed to Be Done

- **Design compact foot-mounted PCB**
- **Create algorithm to interpret fast movement changes (dancing)**
- **Create program to receive events over Bluetooth and translate them to key presses**

What Was Accomplished

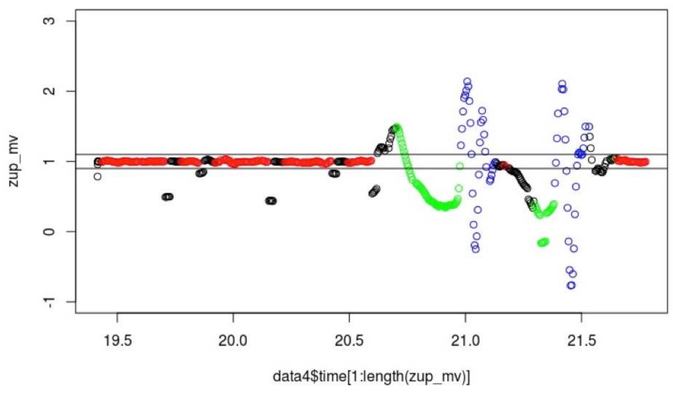
The Custom Boards

- **Used Circuit Maker to do schematic capture and layout**
- **Assembled boards using hot air reflow and soldering iron**
- **3D printed foot-mount platform for attaching PCB to ankle**



The Movement Algorithm

- **Read and processed IMU data at over 200Hz**
- **Recorded IMU data for offline algorithm development**
- **Used dead reckoning to track foot movement and “hit” events**
- **Used matrix transformation to rotate acceleration quaternions into Earth reference frame**



The Communication and Gameplay

- **Used Bluetooth Module to transmit data to laptop host**
- **Wrote Python program which receives the data via Bluetooth**
- **Python program uses auto key stroking to play the DDR game on the laptop**