Campanile-Carillon Model
Sddec18-01

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Client: Dr. Tin-Shi Tam

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http://sddec18-01.sd.ece.iastate.edu/
Overview

- Educate public
- Musical instrument
- Mobile Campanile-carillon model
  - Carillon tutorial system
Task

- Carillons are not mobile in general
  - None have tutorial software
- Make an effective tutorial
- Retrofit our components to current model design
Software Inspiration

- Synthesia, Guitar Hero
Hardware Inspiration

- Light up keys
- Play by light
Falling Notes Software

- Runs on Raspberry pi on startup
- Uses C++ and OpenGL
- Features menu to select midi files from USB
- Midi files are processed and serial communication is synchronized with “falling notes”
- Arduino sends pulse stream, reshaped and passed through each LED
Monitor / Music stand

- Run software
- Ultra wide screen
- 1000 nits
- Durable and Thin
HW/SW used

- **HW:**
  - Raspberry Pi: Display and communicate to arduino
  - Arduino: Communication to LEDs
  - WS2812b LEDs: addressable LEDs need one data wire

- **SW:**
  - C++,OpenGL
  - Arduino IDE

- **Modeling SW**
  - Solidworks
  - Multisim
Spreader Design
Custom Circuit boards

- Connected with ribbon cable and Molex connector
- Fit within the spreader
Power Requirements

- Operate without constant power
- Easily switch between power sources
- Power monitor
- Run for 8 hours
- Ability to recharge
Box Placements

- Meeting with the ME team
- Re-evaluation of power requirements
- Routing wires
- Avoiding all Mechanical linkages
- Saving space
Control Box

Diagram showing connections and components in a control box:

- LED DRIVER
- RPI
- Arduino
- Monitor board output
- LED driver and screen controls
- Arduino Zero
- Serial USB port
- HDMI port
- Raspberry Pi
- 5 Vin, GND, Pin 5, Pin 3, All
- 3 wire output game
- 3 wire output test
- 3 wire input brightness potentiometer
- USB power supply
Previous Design

- Scraped by Client
- LED’s integrated into baton keys
- Concern with structure of baton
- Concern routing wires
- Maintenance concerns
Previous Design Cont.

- Secondary monitor
- Plans on making a 3D model display
- Power limitations
Basic Diagram

Power
- 5V power supply
- 120V power
- 120V wall power
- Inverter
- Battery

Hardware/Software
- WS2812 LED
- Arduino Uno
- Raspberry Pi
- MIDI and PDF files
- USB
- HDMI

User interaction
- Spreader
- Display

Visuals
- Failing Notes
- Sheet Music
- Historical Info
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