



BeatBeam CDR SDP15

Duncan Smith-Freedman, EE

Brandon Sprague, CSE

Brian Hickey, CSE

Daniel Bond, CSE

BeatBeam Team



Daniel Bond
(Fearless) Team Leader

Board Interpretation,
Musical Implementation



Brian Hickey

Networking, Wireless
Connectivity,
Audio/Acoustics, Power



Duncan Smith-
Freedman
Audio-to-Light
Interpreter, Physical
Design

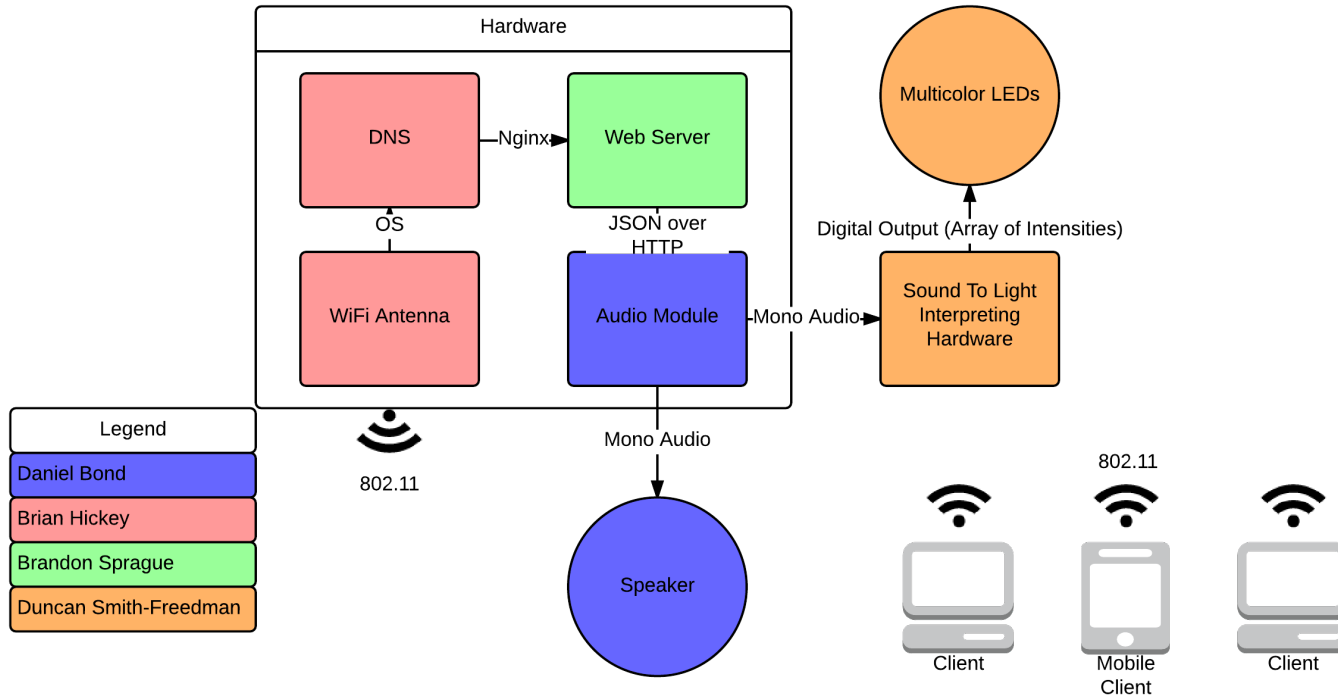


Brandon Sprague
Web Server, Web
Application
Desktop/Mobile
Interfaces

Reminder of System Requirements

- Users with no prior musical experience will be able to make pleasing music more than 90% of the time
- Groups of 20 people will be able to concurrently create music
- <25 ms delay for syncing game state across clients

System Block Diagram (with interfaces defined)



Completed Team Responsibilities from MDR

- Brian
 - Integration with Brandon's Web server
 - Designed and implemented Java API for low-level MIDI calls
 - Audio amplifier and power supply construction, crossover network design (Linkwitz-Riley)
- Duncan
 - Designing and printing central node
 - Creating LED array
 - Power Plan and power implementation

Completed Team Responsibilities from MDR

- Danny
 - Redesigned music module leveraging Java's MIDI sound libraries
 - Change grid interpreter to set major key for simpler music composition
 - Add support for Multi-instrument mode to Music Generator
- Brandon
 - Completing dynamic multi-instrument grid functionality
 - Further integrated mobile functionality
 - Decided against gesture-based control
 - Stress-testing and Benchmarking tools

How Integration was Accomplished

- Web server and music module (Brandon + Danny)
 - Grid state retrieved from web server via HTTP in JSON format (beatbeam.com/grids.json)
- Music module and LED array (Danny + Duncan)
 - Audio jack feeds directly into sound-to-light hardware
- Web server and network configuration (Brandon + Brian)
 - nginx proxies to server
 - Measured average 18.5 ms RTT (Client → Server → Client)

Team Responsibilities and FPR Goals

- Brian
 - Acoustic design and crossover design
 - Power design for entire central node → single transformer to power everything
 - Physical integration of components inside node (collaboration with Duncan)
- Duncan
 - Audio/Visual output integration, customization, and design
 - 3-D design and printing of central node
 - Light smoothing and restructuring
 - Building responsive and meaningful LED array

Team Responsibilities and FPR Goals

- Danny
 - Instrument switching (more than the current 4) so users can customize their sound on the fly
 - Individual instrument volume control
 - Tempo control of composition
 - Preset instrument rhythms for smaller number of users
- Brandon
 - Web interface management console with instrument, volume, preset, and tempo settings

Overview of Upcoming Demonstration

- All four subsystems successfully integrated and interacting
- Evaluators and presenters can take out phones/laptops to connect to BeatBeam SSID
- All connected users can select any grid to modify, then hear the pleasant music
- Live stress test simulation

Questions?

