Rhythm Reloaded
Team 6 CEAC Presentation
Team 6 Reintroduction

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I. Project Introduction
II. Design Norms
III. Market Research
IV. Major Decisions
V. Progress
VI. Challenges
VII. Conclusions
VIII. Questions
A wireless electronic stethoscope that will:
- Aid in auscultation
- Record digital audio data from the patient
- Perform frequency filtering
- Store the audio files on the device
- Transfer the audio files to a computer via USB
- Contain these features in a convenient media-player like form-factor
• Transparency: must be easy to use, no technical experience required
• Stewardship: must protect the user, patient, and environment. HIPAA, Latex Free, RoHS
• Integrity: must provide an accurate representation of the sounds produced by the body
Market Research

Mechanical Stethoscopes
- Chest Piece: Metal Casing with Diaphragm
- Ear Piece: hollow tubing with spring

Electrical Stethoscopes
- Preserve look
- Bulky and Heavy
- IR data Transfer
• 30 participants: 21 nurses (70%), 2 doctors (7%), 6 students (20%), and 1 Nurse Practitioner (3%)
• Overall favorable response
78% would use the device if it was purchased for them by their employer.

18% Yes, 46% Unsure, 36% No, if payment required.
Medical Community Survey

- Average price: $150
- 47% report hearing difficulties
- 20% report uncomfortable earpieces
Microprocessor Decision

• Main Criteria:
  • USB Device functionality
  • DSP Functionality (Hardware Multiply)
  • Power consumption
  • Clock Speed
  • RoHS compliance

• Minor Considerations
  • Available memory, removable media interface, GPIO, ADC, price, dev kit
• First choice: Freescale Coldfire MCF5251
• Development Problems:
  • No Ethernet on dev board
  • File transfer rate over serial
  • Memory image conversion from binary to SREC
• Second Choice: Freescale Coldfire MCF5275
  • Onboard Ethernet
  • Full OS support
• Main Criteria:
  • Hardware Support
  • Open-Source Code
  • User Community
  • Documentation
  • Code Footprint
  • Familiarity to team
  • Price
  • Multi-tasking
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Wireless Decision

- Pros of Wireless:
  - No Wires!
  - Simpler for User
  - Professional

- Cons of Wireless:
  - Separate Power Supply
  - Fidelity
  - Cost
Wireless Decision

• Considerations
  • Wireless Options
  • Range
  • Reliability
  • Not too much more work
  • Development Time
Wireless Decision

• Choice: F2M03MLA:
  • Benefits:
    • Made for Streaming 16bit Audio
    • Small Efficient Package
    • Full FCC Qualification
    • Built in Firmware
  • Deterrents:
    • Cost
• uClinux running on development board out of flash
• U-Boot bootloader development is complete
• LCD driver complete
• I2C driver complete
• QSPI driver complete
• FIR filters progressing
• Two daughterboards designed and received
• Chestpiece microphone selected
• Chestpiece casing machined
Challenges

- Atmospheric
- Open source software != functional
- Misleading Bluetooth product documentation
- Meshing assembly with C
- Prototyping
- Intellectual Property Discussion
- Learning to write Linux software
• Team has made progress on many aspects
• Project is technically feasible
• Time constraints will limit scope of success
Questions?