**Project Overview**

- Develop a guitar that teaches the user how to play a song.
  - LEDs in the neck show finger position.
  - LCD screen on the body shows song name and tempo information.
  - Allows the user to slow song down in order to learn at his or her own speed.

**System Diagram**

**Hardware**

- **Guitar Description**
  - **Guitar Style:** Acoustic/Electric guitar with built-in guitar.
  - **Neck of guitar:**
    - Contoured 120 LEDs for easy illumination.
    - 24 category - 4 for the strings, 20 for the frets.
    - LED - output brightness.
    - **Fingerboard and fretboard materials:** Rosewood.
  - **Body of guitar:**
    - Body wood is stable with an outer top.
    - Contains microcontroller, push buttons, switches, knobs, buttons, and LCD screen.

**Hardware Description**

- **Embedded Arm 7260**
  - Single Board Computer
    - 54 DC inputs, 18 DC outputs
    - 25MHz speed
  - **Linux OS**
    - Ultra-low-power consumption
    - Small footprint - 100ms to 100s
  - **PC-134 Peripheral**
    - USB DC jack
    - 5V/12V - 52 O.D.
  - **LED Screen**
    - 7x16 Characters readable

- **LEDs**: Low power consumption, 100mA input.

- **Battery Pack**: 4 AA

- **Buttons**: 4

**Group Members**

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  - Software
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  - Software
- **Joseph Molasky**
  - Team Leader/Hardware
- **Dr. William Eads**
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**Software**

- **Microcontroller Software Description**
  - **Software Components**:
    - **File Input Program**:
      - Reads in all music files on the board and stores song names.
    - **Button Program**:
      - Allows user to choose the song they wish to play.
      - Provides play/pause/stop functionality.
      - Used to select song tempo.
    - **LCD Screen Program**:
      - Shows name of the song, tempo, note value, and whether the song is playing or paused.
    - **LED Program**:
      - Reads the music file and actuates the correct LEDs.

**File Conversion Description**

- **Uses power tab files (.ptb)**
  - Can be downloaded from sites such as ultimate-guitar.com or created using music editors.

  - Power tab files are converted into XML files using open-source software named TuxGuitar.

  - Java program converts XML files to .txt files that contain only the necessary information.