Digital Music Tutor

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How it Works

- User selects a song
- Song starts
- User plays notes prompted by sheet music (or optional video prompt)
- User’s input is compared to the song ROM and scored

User score is displayed through seven-segment display on labkit
Lights Module

- Song select switches
- Song start decoder
- Counter
- Song ROM
- Shiny goodness! (LEDs)
- Buttons
- Light enable
- Light "decoder"
- Start value
- Address
- Reset
- Count_now
- Early
- On time
- Late
- End of song
- To sound decoder
- Notes

Single notes or chords are played using clock dividers

The wires which light the buttons act as enables for the sound

Chords are played by combining the square waves before sending to the speaker
# Note Clock Frequencies

<table>
<thead>
<tr>
<th>Note Name</th>
<th>Frequency (Hz)</th>
<th>1.8432 Mhz Clock Ticks</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>349.228</td>
<td>5278</td>
</tr>
<tr>
<td>F#</td>
<td>369.994</td>
<td>4982</td>
</tr>
<tr>
<td>G</td>
<td>391.995</td>
<td>4702</td>
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<tr>
<td>G#</td>
<td>415.305</td>
<td>4438</td>
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<tr>
<td>A</td>
<td>440</td>
<td>4189</td>
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<td>A#</td>
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<td>3990</td>
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<tr>
<td>B</td>
<td>493.883</td>
<td>3732</td>
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<tr>
<td>C</td>
<td>523.251</td>
<td>3522</td>
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<tr>
<td>C#</td>
<td>554.365</td>
<td>3324</td>
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<tr>
<td>D</td>
<td>587.33</td>
<td>3138</td>
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<tr>
<td>D#</td>
<td>622.254</td>
<td>2962</td>
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<tr>
<td>E</td>
<td>659.255</td>
<td>2795</td>
</tr>
</tbody>
</table>
Scoring Module

Timing checker (bit 0)

Timing checker (bit 11)

12

points

reset

12

84 (7 * 12)

early

Song ROM

on time

late

12

Buttons

10

score

(to score display)

12

Button synchronizer

12

Button hold

12

(to lights and sound ROM)

Video (Optional)

- Over Thanksgiving Break we will evaluate the feasibility of video
- By December 1, 2004 we will commit to building or eliminate the video module