Self-Tuning Guitar

Team 10: The Tune Squad
The Team

From Left to Right: Ben Tanis, Chris Diemer, Sam Baas, Cheyn Rushing
Outline

➢ Design Approach
➢ Current Status
➢ Deliverables
➢ Future Goals
➢ Budget
➢ Questions
Test-Based Design Approach

?  Question

Implement

Learn

Test

http://i.imgur.com/B7a9R.jpeg
Frequency Change Test

FREQUENCY CHANGE PER TURN

\[ y = 12.719x + 0.6649 \]
\[ R^2 = 0.9846 \]
Beaglebone Black Sample Rate Test

```
/sys/devices/ocp.2/helper.14/AIN0
Total runtime is: 138.085
Average sample time is: 0.00128
beaglebone:~/guitar/str1#

/sys/devices/ocp.2/helper.14/AIN1
Total runtime is: 138.421
Average sample time is: 0.00128
beaglebone:~/guitar/str2#

beaglebone:~/guitar/str3# ./getAnalog
Starting program to read analog signals.
/sys/devices/ocp.2/helper.14/AIN2
Total runtime is: 113.191
Average sample time is: 0.00111
beaglebone:~/guitar/str3#

beaglebone:~/guitar/str4# ./getAnalog
Starting program to read analog signals.
/sys/devices/ocp.2/helper.14/AIN3
Total runtime is: 112.594
Average sample time is: 0.00111
beaglebone:~/guitar/str4#
```
Tuning Peg Torque Test
# Torque Test Data

<table>
<thead>
<tr>
<th>String</th>
<th>in-lb (Tune Down)</th>
<th>in-lb (Tune Up)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>12</td>
<td>36+</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
<td>36+</td>
</tr>
<tr>
<td>D</td>
<td>9</td>
<td>36+</td>
</tr>
<tr>
<td>G</td>
<td>10</td>
<td>36+</td>
</tr>
</tbody>
</table>
Bass Guitar Sampling Test
Current Status

➢ Bread Board H-Bridge
➢ Bread Board Amp
➢ Basic Motor Control
➢ Motor Solution
➢ Analog Sampling on BBB
Deliverables

➢ 1 Self Tuning Bass Guitar with UI
➢ Marketing Brochure
➢ User Manual
➢ Final Design Report
➢ Team Website
Future Goals

➢ Code 16x2 character display UI
➢ Mount motors
➢ Mount polyphonic pickup
➢ Create board layouts for H-bridge & Amp
➢ Code motor control
➢ Code signal processing
➢ Create one string prototype
# Budget

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning Balance</td>
<td></td>
<td>$300.00</td>
</tr>
<tr>
<td>9g Continuous Rotation Micro Servo</td>
<td>$4.99</td>
<td>$295.01</td>
</tr>
<tr>
<td>Power Gig: Rise of the SixString Guitar Bundle -Xbox 360</td>
<td>$39.68</td>
<td>$255.33</td>
</tr>
<tr>
<td>Arduino Due</td>
<td>$43.01</td>
<td>$212.32</td>
</tr>
<tr>
<td>Gear Motor</td>
<td>$9.99</td>
<td>$202.33</td>
</tr>
<tr>
<td>TIP107 Transistor (x10)</td>
<td>$7.80</td>
<td>$194.53</td>
</tr>
<tr>
<td>TIP102 Transistor (x10)</td>
<td>$7.40</td>
<td>$187.13</td>
</tr>
<tr>
<td>LCD Module</td>
<td>$9.99</td>
<td>$177.14</td>
</tr>
<tr>
<td>Beaglebone Black</td>
<td>$45</td>
<td>$132.14</td>
</tr>
<tr>
<td>Black &amp; Decker power screwdriver*3@$21.00ea</td>
<td>$63.00</td>
<td>$69.14</td>
</tr>
</tbody>
</table>
Product Cost: $325
  Parts - $250
  Labor/Logistics - $20
  Markup - %20
Questions?