NewU Incorporated

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May 1st, 2003
Purpose

- The company seeks to expand fields of science
- Open up fields that mechatronics can exploit
- People with disabilities are neglected
- Increase funding for diverse causes
Newest Invention

- Smart Cane 2003 –(SC03)

- Brush motor
- Infrared sensor
- Transmitter & receiver
- Ultrasonic sensor

SC03
Functionality

- Detect objects in path with 3 different levels (sonar)
- Detect stairs (preventing falls)
- Convenient activation and termination of device
- Measures in place to prevent loss of device
Main Hardware Component

- Range (3cm to 3m)
- Frequency 40KHz
- 90 degree search width
Circuit Schematic
Code - Sonar

''''sonar sensor''''

wDist var word
INT con 0
ECHO con 1

convfac con 74

main_sonar:
pulsout INT, 5
output INT
rctime ECHO, 1, wDist
wDist = wDist/convfac
pause 10
debug dec wDist, cr
if wDist<24 then motor1
if wDist<36 then motor2
if wDist<48 then motor3

if in14=1 then clik
goto clik0
Code - motor (sample)

---

motor1:

output 10 '555 timer on/off
output 4 'up/down
output 5 'increment
output 3 'chip select

high 10
low 3
low 4

for x = 1 to 99
high 5
low 5
next

high 4

for y = 1 to 1
high 5
low 5
next

goto here
Concerns about Design

- Sonar device may elicit unwanted responses from animals

<table>
<thead>
<tr>
<th>Animal</th>
<th>Frequency Low</th>
<th>Frequency High</th>
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</thead>
<tbody>
<tr>
<td>Humans</td>
<td>20</td>
<td>20,000</td>
</tr>
<tr>
<td>Cats</td>
<td>100</td>
<td>32,000</td>
</tr>
<tr>
<td>Dogs</td>
<td>40</td>
<td>46,000</td>
</tr>
<tr>
<td>Horses</td>
<td>31</td>
<td>40,000</td>
</tr>
<tr>
<td>Elephants</td>
<td>16</td>
<td>12,000</td>
</tr>
<tr>
<td>Cattle</td>
<td>16</td>
<td>40,000</td>
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<tr>
<td>Bats</td>
<td>1,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Grasshoppers and locusts</td>
<td>100</td>
<td>50,000</td>
</tr>
<tr>
<td>Rodents</td>
<td>1,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Whales and dolphins</td>
<td>70</td>
<td>150,000</td>
</tr>
<tr>
<td>Seals and sea lions</td>
<td>200</td>
<td>55,000</td>
</tr>
</tbody>
</table>
Concerns about Design (cont.)

- Ultrasonic Dog Chaser produces a discomforting, but not harmful, high frequency sound, audible to dogs but not to humans.
- Frequency Range: 20,000 Hz - 25,000 Hz
  Sound Pressure: 135 dB
  Effective Range: Within 20 feet
# Cost Estimate

<table>
<thead>
<tr>
<th>Items</th>
<th>Cost</th>
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<tbody>
<tr>
<td>IR Transmitter with heat shrink tubing</td>
<td>$5.20</td>
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<tr>
<td>Infrared Receiver</td>
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<td>Devantech SRF04 Ultrasonic Range Finder</td>
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<td>Board of Education</td>
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<td>9V Battery + AA battery</td>
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<td>ZH15431 brush motor (vibration motor)</td>
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<td>Cane</td>
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<td>Mosfet IRF510</td>
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<td>SI Diode IN4001</td>
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<td>NE555 CMOS Timer</td>
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<td>DS1804 -100K</td>
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<tr>
<td>Miscellaneous</td>
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<td><strong>Total</strong></td>
<td><strong>$187.69</strong></td>
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</table>

Mass production costs estimate: $50.00 ~ $70.00
Future Improvements

- Cane will detect traffic lights and pedestrian signals
- Compass will guide the user more accurately
- Cane will be adjustable to different height
Thank you All!

Questions & Suggestions