NewU Incorporated

Team Members:

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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

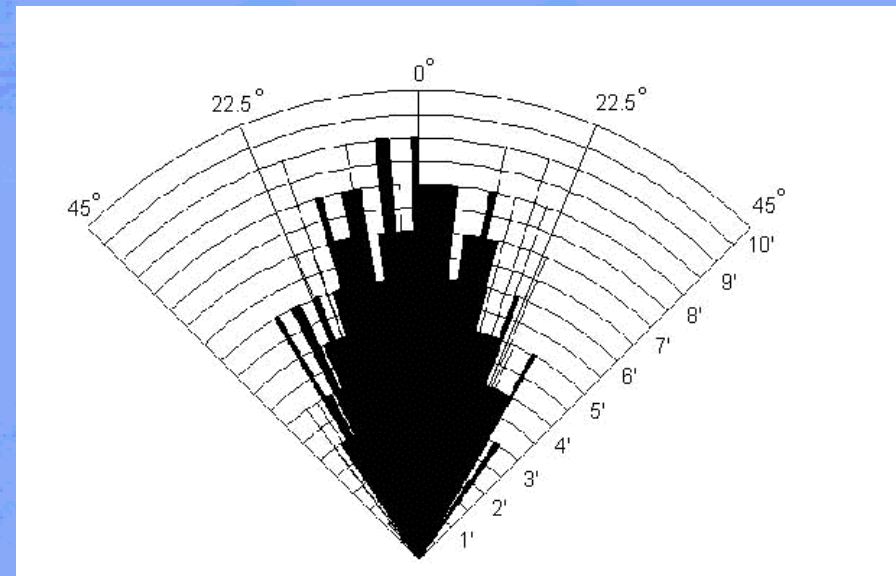- Smart Cane 2003 –(SC03)

Brush motor

Infrared sensor
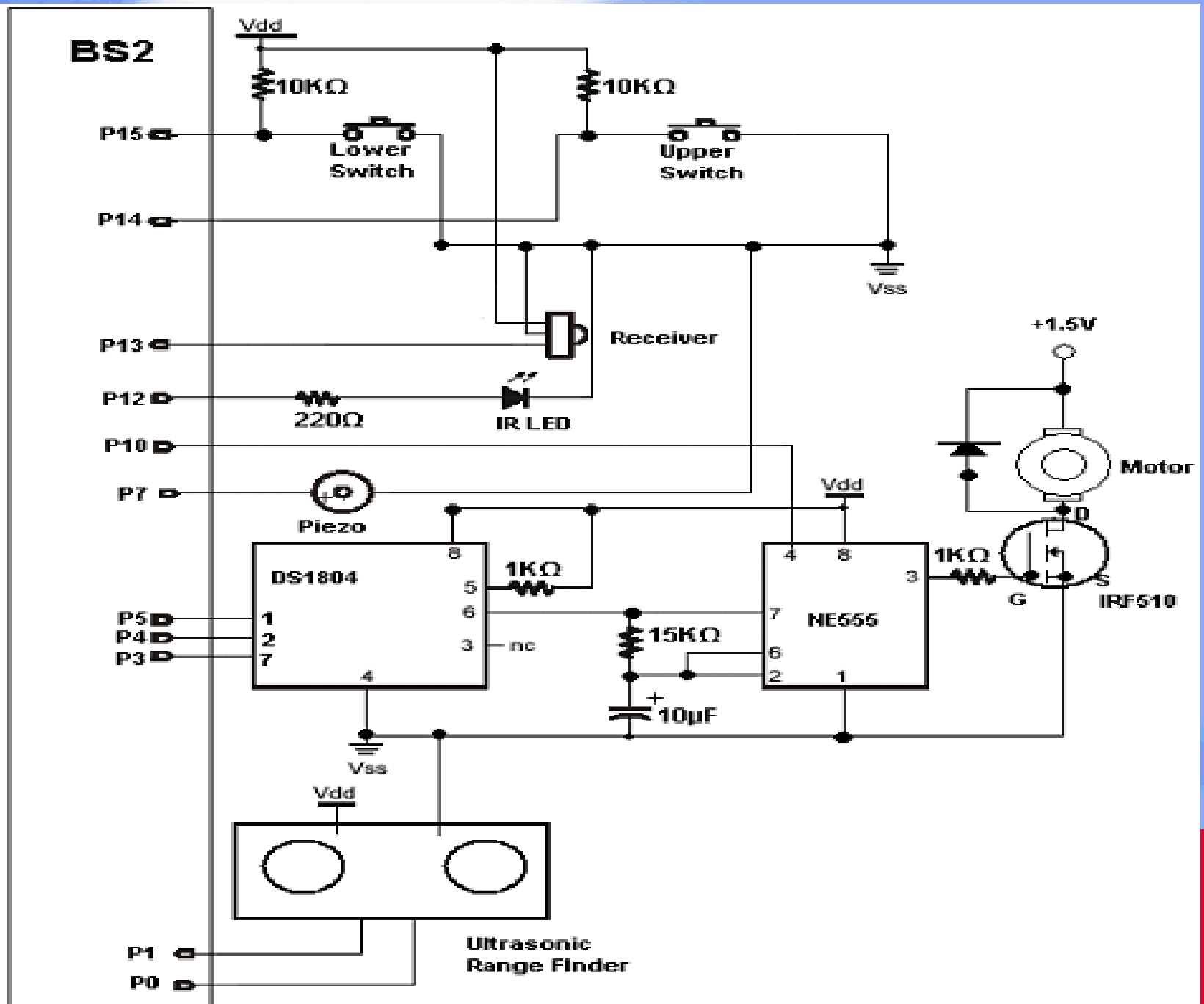Transmitter & receiver

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)

```
'_____motor levels_____
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

Frequency Range of Hearing for Humans and Selected Animals:

Animal	Frequency (hertz)	
	Low	High
Humans	20	20,000
Cats	100	32,000
Dogs	40	46,000
Horses	31	40,000
Elephants	16	12,000
Cattle	16	40,000
Bats	1,000	150,000
Grasshoppers and locusts	100	50,000
Rodents	1,000	100,000
Whales and dolphins	70	150,000
Seals and sea lions	200	55,000

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

Items	Cost
IR Transmitter with heat shrink tubing	$5.20
Infrared Receiver	$2.60
Devantech SRF04 Ultrasonic Range Finder	$32.95
Board of Education	$100.00
9V Battery + AA battery	$5.50
ZH15431 brush motor (vibration motor)	$2.50
Cane	$15.00
Mosfet IRF510	$1.99
SI Diode IN4001	$0.95
NE555 CMOS Timer	$2.00
DS1804 -100K	$4.00
Box	$5.00
Miscellaneous	$10.00
Total	**$187.69**

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