ECE411 Homework\_6

Test Plan, Revision 2.0

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Contents

[Introduction 3](#_Toc467681577)

[Pretest preparation 3](#_Toc467681578)

[Test equipment / Test setup and calibration 3](#_Toc467681579)

[Systems Test 3](#_Toc467681580)

[Test Case 01 Description 3](#_Toc467681581)

[Test Case 01 3](#_Toc467681582)

[Test Case 02 Description 4](#_Toc467681583)

[Test Case 02 5](#_Toc467681584)

[Citations 6](#_Toc467681585)

## Introduction

We have designed a metronome to satisfy the practicum requirements of an input device, output device, and microcontroller.

We define metronome as a pace setting device that provides an aural and visual indictor of pace.

A formal definition:

“a mechanical or electrical instrument that makes repeated clicking sounds at an adjustable pace, used for marking rhythm, especially in practicing music.” [1]

To test this, the focus is on the actuators to verify the device is performing the designed function.

## Pretest preparation

1. Ohm board to verify as built assembly meets requirements for system testing.
2. Ensure board has 9V battery installed.

## Test equipment / Test setup and calibration

1. Human of average intelligence, physique, hearing, visual acuity.
2. Multimeter to perform Ohm test
3. 9V battery

## Systems Test

### Test Case 01 Description

Verify on/off (toggle) switch work, ie does the button turn the device on/off.

### Test Case 01

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | Test Writer | Team#14 (Kyle Johnson, Kam Robertson, Saly Hakkoum, Brian Dunn) |  |  |  |  |
|  | Test case name: | Test Case 01 |  |  |  |  |
|  | Description | Verify on/off (toggle) switch work |  |  |  |  |
|  | Type | Black Box |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Tester Information |  |  |  |  |  |
|  | Name of tester |  |  |  |  |  |
|  | Hardware Version | Version 2.0 |  |  |  |  |
|  | Setup | 1. Ohm board to verify as built assembly meets requirements for system testing. 2. Ensure board has 9V battery installed. |  |  |  |  |
|  |  |  |  |  |  |  |
| Step | Action | Expected Results | Pass | Fail | NA | Comment |
| 1 | Position metronome on flat surface | Device ready for visual observation. |  |  |  |  |
| 2 | Verify device is at initial state | Observe initial state, OFF |  |  |  |  |
| 3 | Press power button | The device changes state, visual indications such as lights turn on. |  |  |  |  |
| 4 | Verify device is in on state | Lights turn on. |  |  |  |  |
| 5 | Press power button | The device changes state, visual indications such as lights turn off |  |  |  |  |
| 6 | Verify device is in off state | Lights are off |  |  |  |  |

### Test Case 02 Description

Verify button changes function of metronome.

Lights (LED) flash when button pressed.

### Test Case 02

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Test Writer | Team#14 (Kyle Johnson, Kam Robertson, Saly Hakkoum, Brian Dunn) |  |  |  |  |
|  | Test case name: | Test Case 02 |  |  |  |  |
|  | Description | Verify button changes function of device |  |  |  |  |
|  | Type | Black Box |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Tester Information |  |  |  |  |  |
|  | Name of tester |  |  |  |  |  |
|  | Hardware Version | Version 2.0 |  |  |  |  |
|  | Setup | 1. Ohm board to verify as built assembly meets requirements for system testing. 2. Ensure board has 9V battery installed. |  |  |  |  |
|  |  |  |  |  |  |  |
| Step | Action | Expected Results | Pass | Fail | NA | Comment |
| 1 | Position metronome on flat surface | Device ready for visual observation. |  |  |  |  |
| 2 | Verify device is at initial state | Observe initial state, OFF |  |  |  |  |
| 3 | Press power button | The device changes state, visual indications such as lights turn on. |  |  |  |  |
| 4 | Verify device is in on state | Lights turn on. |  |  |  |  |
| 5 | Press function button | Lights flash when button pressed |  |  |  |  |
| 6 | Observe change in function | Verify function changes when button pressed |  |  |  |  |

### Test Case 03 Description

Verify button changes function of device (modes)

1. Lights (LED) flash when button pressed once.
2. Lights (LED) flash when button pressed twice in addition to sound (beep) matching up with each LED flash.
3. Mute: UUT returns to idle state

### Test Case 03

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Test Writer | Team#14 (Kyle Johnson, Kam Robertson, Saly Hakkoum, Brian Dunn) |  |  |  |  |
|  | Test case name: | Test Case 03 |  |  |  |  |
|  | Description | Verify button changes function of device (modes) |  |  |  |  |
|  | Type | Black Box |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Tester Information |  |  |  |  |  |
|  | Name of tester |  |  |  |  |  |
|  | Hardware Version | Version 2.0 |  |  |  |  |
|  | Setup | 1. Ohm board to verify as built assembly meets requirements for system testing. 2. Ensure board has 9V battery installed. |  |  |  |  |
|  |  |  |  |  |  |  |
| Step | Action | Expected Results | Pass | Fail | NA | Comment |
| 1 | Position metronome on flat surface | Device ready for visual observation. |  |  |  |  |
| 2 | Verify device is at initial state | Observe initial state, OFF |  |  |  |  |
| 3 | Press power button | The device changes state, visual indications such as lights blink once, sound occurs "beep" at initial power on |  |  |  |  |
| 4 | Verify device is in on state | Lights blink, single beep, no additional sound, UUT idle |  |  |  |  |
| 5 | Press function button | Lights flash when button pressed once |  |  |  |  |
| 6 | Observe change in function | The device changes state, visual indication such as lights begin flashing in an alternating sequence (no sound) that coincides with beats per minute |  |  |  |  |
| 7 | Press function button | Verify function changes when button pressed |  |  |  |  |
| 8 | Observe change in function | The device changes state, visual indication such as lights begin alternating sequence along with sound to accompany each light flash that coincides with beats per minute |  |  |  |  |
| 9 | Press function button | UUT returns to idle state |  |  |  |  |
| 10 | Observe change in function | UUT returns to idle state, no lights, sound. |  |  |  |  |

### Test Case 04 Description

Verify rotary encoder function of device

Verify UUT tempo changes (increases) with clockwise rotation of rotary encoder

Verify UUT tempo changes (decreases) with counter-clockwise rotation of rotary encoder

### Test Case 04

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Test Writer | Team#14 (Kyle Johnson, Kam Robertson, Saly Hakkoum, Brian Dunn) |  |  |  |  |
|  | Test case name: | Test Case 03 |  |  |  |  |
|  | Description | Verify rotary encoder function of device |  |  |  |  |
|  | Type | Black Box |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Tester Information |  |  |  |  |  |
|  | Name of tester |  |  |  |  |  |
|  | Hardware Version | Version 2.0 |  |  |  |  |
|  | Setup | 1. Ohm board to verify as built assembly meets requirements for system testing. 2. Ensure board has 9V battery installed. |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Step | Action | Expected Results | Pass | Fail | NA | Comment |
| 1 | Position metronome on flat surface | Device ready for visual observation. |  |  |  |  |
| 2 | Verify device is at initial state | Observe initial state, OFF |  |  |  |  |
| 3 | Press power button | The device changes state, visual indications such as lights blink once, sound occurs "beep" at initial power on |  |  |  |  |
| 4 | Verify device is in on state | Lights blink, single beep, no additional sound, UUT idle |  |  |  |  |
| 5 | Press function button | Lights flash when button pressed once |  |  |  |  |
| 6 | Observe change in function | The device changes state, visual indication such as lights begin flashing in an alternating sequence (no sound) that coincides with beats per minute |  |  |  |  |
| 7 | Press function button | Verify function changes when button pressed |  |  |  |  |
| 8 | Observe change in function | The device changes state, visual indication such as lights begin alternating sequence along with sound to accompany each light flash that coincides with beats per minute |  |  |  |  |
| 9 | Turn Rotary Encoder (clockwise) | UUT exhibits tempo increase (light sequence and sound sequence) |  |  |  |  |
| 10 | Observe change in function | Verify UUT tempo changes (increases) with clockwise rotation of rotary encoder |  |  |  |  |
| 11 | Turn Rotary Encoder (counter-clockwise) | UUT exhibits tempo decrease (light sequence and sound sequence) |  |  |  |  |
| 12 | Observe change in function | Verify UUT tempo changes (decreases) with counter-clockwise rotation of rotary encoder |  |  |  |  |

## Citations

1. (Dictionary.com "metronome, 2016)