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**JoyLink Testing Plan and Suite**

Group 01

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**Testing Plan**

Our testing strategy will utilize white-box testing to verify the logic of the code is sound and works as expected.

**White Box Testing Strategy:** We will specifically be utilizing unit tests as our form of white box testing. We will be using white box testing primarily for our backend (electron folder) where most of our features are handled such as processing inputs, executing keyboard/mouse actions, sending data to the frontend, launching a server, managing connected clients, etc. We will calculate and record the statement and branch coverages of our unit tests and keep track of the pass/fails of each test in a table to help better visualize and conceptualize each test as well as show the overall effectiveness of our testing.

**Black Box Testing Strategy:** We will also be using black-box testing to validate system behaviour and expected inputs/outputs. Specifically, we will be utilizing acceptance tests as our form of black box testing to ensure that all requirements of the program are met. For the acceptance tests, we will report the statement coverage achieved by each test.

For black box testing strategies, we are utilizing equivalence partitioning for all of the different controller input types such as buttons, analog sticks, voice commands, and motion controls. For example, all buttons are a part of the same input class. Equivalence is also extended to the same action type for different input classes. For example, a mouse click mapped from a voice command or a mouse click mapped from a button press belongs in the same equivalence class. The action equivalence classes are key presses, multiple keypresses, mouse clicks, and mouse motion.

**Tools Used:**

**White Box Testing Strategy:**

* Vitest: For the unit tests of white box testing, we will be utilizing
* Google Sheets and Google Docs

**Black Box Testing Strategy:**

* Google Sheets and Google Docs to help organize tables of tests

**Testing Suites Implementation**

**White Box Testing Implementation:** The white box testing unit test files are in the directory “./joylink/desktop-app/src”. The test files are:

* main.test.ts
* util.test.ts
* server.test.ts
* inputs.test.ts

The above tests files cover all the files present in the src/electron folder. There are more files inside of this directory that were not tested as it was not necessary as a lot of these files are config files that simply define the environment and packages of the application, thus they cannot be covered in tests. We did not perform any unit tests on any .tsx files as those are the front end files and we tested all of those files via acceptances tests which are documented in the Black Box Testing Results section below.

**Black Box Testing Implementation:** The categories that we record for our acceptance tests are, Test Case ID , Name, FR Tested, Description, Test Steps, Expected Result, Actual Result, Coverage, and Status (Pass/ Fail). The tests are categorized into 4 main categories: server, connection, customization, and processing.

**Types of Tests Ran:**

**White Box Test Types:** Vitest was used to perform unit testing and verify correctness of all back end logic functions, events and types on the backend.

**Black Box Test Types:** For black box end to end testing acceptance tests were run to verify correctness of the software. All the FRs listed in the SRS are covered by these tests to ensure completeness.

**How To Run White Box Testing:**

1. Open up joylink directory in the terminal
2. Enter into the desktop-app directory by running “cd desktop-app” in the terminal
3. Run “npm run test:unit” (provided you have all the dependencies installed via npm install. Also go through our README for setup instructions)
   1. This will run all of the tests and show results of all of the tests ran as well as the coverage.

**How To Run Black Box Testing:**

**Pre-requisites:**

**Just once:**

Follow instructions in joylink/README.

**For each test case:**

Run ‘npm run dev’ in the joylink/desktop-app. This will open a console and the PC UI.

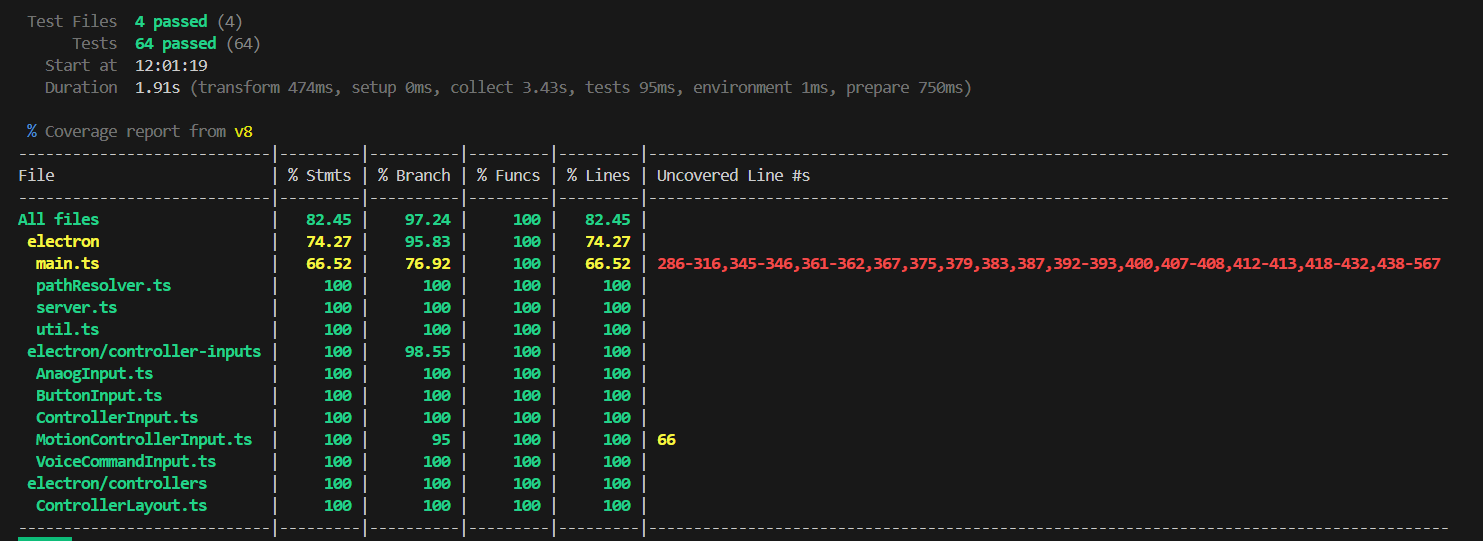
**Cleanup:  
For each test case:**

CTRL + C in the console to close the application.

Close any tabs opened in the phone.

**Testing Results:**

**White Box Testing Results:**



Our results demonstrate that we essentially have 95-100% branch and statement coverage for every single backend file with the exception of main.ts. The reason that we could not get 100% statement coverage for main.ts is because most of the statements could not be covered due to them needing to have socket events be mocked which was extremely difficult to handle. With the exception of that, we tested every other file involving the backend successfully, with positive results. All of our tests passed, which demonstrates that the backend logic of our program is functioning as we would want them to.

**Black Box Testing Results:**

**Black Box Testing: Acceptance Tests’ Table:**

| Test Case ID | Name | FR Tested | Description | Test Steps | Expected Result | Actual Result | Coverage | Status  (Pass/ Fail) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1.1 | Serve Controller | FR1,  FR2 | Ensure PC server can be started and controller can be accessed by the QR-Code | Appendix A.1.1 | Appendix A.1.1 | Appendix A.1.1 | Appendix A.1.1 | Pass |
| 1.2 | Connection via URL | FR2,  FR3 | Ensure that the Controller can be accessed by typing the URL and a real time connection is established. | AppendixA.1.2 | AppendixA.1.2 | AppendixA.1.2 | AppendixA.1.2 | Pass |
| 2.1 | Connection management | FR4, FR5, FR6 | Ensure that the PC remembers the currently connected client’s layout and prevents more connections | Appendix  A.2.1 | Appendix  A.2.1 | Appendix  A.2.1 | Appendix  A.2.1 | Pass |
| 2.2 | PC Disconnect | FR7 | Ensures that the PC has full control in disconnecting users | Appendix  A.2.2 | Appendix  A.2.2 | Appendix  A.2.2 | Appendix  A.2.2 | Pass |
| 3.1 | Button To Key Mapping | FR8 | Ensure that a user can customize their button to key mappings | Appendix A.3.1 | Appendix A.3.1 | Appendix A.3.1 | Appendix A.3.1 | Pass |
| 3.2 | Button To Click Mapping | FR8 | Ensure that a user can customize their button to mouse click mappings | Appendix A.3.2 | Appendix A.3.2 | Appendix A.3.2 | Appendix A.3.2 | Pass |
| 3.3 | Analog to buttons mapping | FR9 | Ensure that a user can customize their analog to keys mapping | Appendix A.3.3 | Appendix A.3.3 | Appendix A.3.3 | Appendix A.3.3 | Pass |
| 3.4 | Analog to mouse motion mapping | FR9 | Ensure that a user can customize their analog to mouse motion mapping | Appendix A.3.4 | Appendix A.3.4 | Appendix A.3.4 | Appendix A.3.4 | Pass |
| 3.5 | Voice To Key Mapping | FR10 | Ensure that a user can customize their voice to key mappings | Appendix A.3.5 | Appendix A.3.5 | Appendix A.3.5 | Appendix A.3.5 | Pass |
| 3.6 | Voice To Mouse Click Mapping | FR10 | Ensure that a user can customize their button to voice click mappings | Appendix A.3.6 | Appendix A.3.6 | Appendix A.3.6 | Appendix A.3.6 | Pass |
| 3.7 | Controller motion to buttons mapping | FR11 | Ensure that a user can customize their controller motion to keys mapping | Appendix A.3.7 | Appendix A.3.7 | Appendix A.3.7 | Appendix A.3.7 | Pass |
| 3.8 | Controller motion to mouse motion mapping | FR11 | Ensure that a user can customize their controller motion to mouse motion mapping | Appendix A.3.8 | Appendix A.3.8 | Appendix A.3.8 | Appendix A.3.8 | Pass |
| 3.9 | Default mappings | FR13 | Ensure that a default mapping is given to users | Appendix A.3.9 | Appendix A.3.9 | Appendix A.3.9 | Appendix A.3.9 | Pass |
| 3.10 | Choose layout 1 | FR12 | Ensure layout 1 works | Appendix A.3.10 | Appendix A.3.10 | Appendix A.3.10 | Appendix A.3.10 | Pass |
| 3.11 | Choose layout 2 | FR12 | Ensure layout 2 works | Appendix A.3.11 | Appendix A.3.11 | Appendix A.3.11 | Appendix A.3.11 | Pass |
| 4.1 | Process button press | FR14 | Ensure button presses get registered to the PC | Appendix A.4.1 | Appendix A.4.1 | Appendix A.4.1 | Appendix A.4.1 | Pass |
| 4.2 | Process analog movement | FR15 | Ensure analog movement gets registered to the PC | Appendix A.4.2 | Appendix A.4.2 | Appendix A.4.2 | Appendix A.4.2 | Pass |
| 4.3 | Process voice commands | FR16 | Ensure voice commands get registered to the PC | Appendix A.4.3 | Appendix A.4.3 | Appendix A.4.3 | Appendix A.4.3 | Pass |
| 4.4 | Process controller motion | FR17 | Ensure controller movement gets registered to the PC | Appendix A.4.4 | Appendix A.4.4 | Appendix A.4.4 | Appendix A.4.4 | Pass |

# Appendix A

1.1  
 **Test Steps:**

* 1. Click Start > Customize > Play on the PC.
  2. Scan the QR-Code using your phone allowing redirection to the encoded link.
  3. Accept the security warnings displayed by your browser (if any).

**Expected Results:**

1. Console outputs   
   ‘Server running at https://<your\_private\_ip>:<port>’.
2. QR-code appears on the PC screen.
3. Controller layout appears on the phone.

**Actual Results:**

1. Console outputs   
   ‘Server running at https://<your\_private\_ip>:<port>’.
2. QR-code appears on the PC screen.
3. Controller layout appears on the phone.

**Coverage:**  
 desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

1.2

**Test Steps:**

1. Click Start > Customize > Play on the PC.
2. Open a browser tab on your phone and enter the URL displayed on the PC.
3. Accept the security warnings displayed by your browser (if any).

**Expected Results:**

1. URL appears on the PC screen.
2. Controller layout appears on the phone.
3. Controller layout on the phone shows that the controller is connected.
4. The PC screen shows that a controller is connected.

**Actual Results:**

1. URL appears on the PC screen.
2. Controller layout appears on the phone.
3. Controller layout on the phone shows that the controller is connected.
4. The PC screen shows that a controller is connected.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

2.1

**Test Steps:**

1. Click Start > Layout-Two > Customize > Play on the PC.
2. Scan the QR-Code using your phone allowing redirection to the encoded link.
3. Accept the security warnings displayed by your browser (if any).
4. Scan the QR-Code using another phone allowing redirection to the encoded link.
5. Accept the security warnings displayed by your browser (if any).
6. Close the controller tabs on both phones.
7. Scan the QR-Code again using your first phone allowing redirection to the encoded link.
8. Accept the security warnings displayed by your browser (if any).

**Expected Results:**

1. The connection record is displayed on the PC after the first device connects.
2. The second device’s connection request is rejected.
3. The first device is able to reconnect successfully with a status of connected.
4. The first device, after reconnecting, accesses layout 2 again.

**Actual Results:**

1. The connection record is displayed on the PC after the first device connects.
2. The second device’s connection request is rejected.
3. The first device is able to reconnect successfully with a status of connected.
4. The first device, after reconnecting, accesses layout 2 again.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-96, 108-127

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutTwo.tsx: 1-279

2.2

**Test Steps:**

1. Click Start > Customize > Play on the PC.
2. Scan the QR-Code using your phone allowing redirection to the encoded link.
3. Accept the security warnings displayed by your browser (if any).
4. Click the disconnect button next to the connection record on the PC.
5. Again, scan the QR-Code using your phone allowing redirection to the encoded link.
6. Accept the security warnings displayed by your browser (if any).

**Expected Results:**

1. The Controller’s status says disconnected after the disconnect command is given to the PC.
2. The second connection attempt is successful with a status of connected.

**Actual Results:**

1. The Controller’s status says disconnected after the disconnect command is given to the PC.
2. The second connection attempt is successful with a status of connected.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.1

**Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in button X’s row.
3. Unselect all selected keys, select the B key.
4. Press the Save Changes button.

**Expected Results:**

1. Preview of controls is displayed with the B key mapped to the X button.

**Actual Results:**

1. Preview of controls is displayed with the B key mapped to the X button.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

desktop-app/src/ui/components/customizeModal.tsx: 1-277

desktop-app/src/ui/components/keyboard.tsx: 1-374

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.2  
 **Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in button Y’s row.
3. Press the mouse tab and then select Left click.
4. Press the Save Changes button.

**Expected Results:**

1. Preview of controls is displayed with the left click mapped to the X button.

**Actual Results:**

1. Preview of controls is displayed with the left click mapped to the X button.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

desktop-app/src/ui/components/customizeModal.tsx: 1-277

desktop-app/src/ui/components/keyboard.tsx: 1-374

desktop-app/src/ui/components/mouse.tsx: 1-106

3.3

**Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in the right analog’s row.
3. Select the keyboard tab if not already selected.
4. On the screen Click E > Next > D > Next > S > Next > F > Save Changes.

**Expected Results:**

1. Preview of the controls for the right analog is displayed with the following directions mapped to the keys: UP->E, LEFT->S, DOWN->D, RIGHT->F.

**Actual Results:**

1. Preview of the controls is displayed with the following directions mapped to the keys: UP->E, LEFT->S, DOWN->D, RIGHT->F.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

desktop-app/src/ui/components/customizeModal.tsx: 1-277

desktop-app/src/ui/components/keyboard.tsx: 1-374

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.4

**Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in the right analog’s row.
3. Select the mouse tab if not already selected.
4. Set the sensitivity to 50 and click Save Changes.

**Expected Results:**

1. Preview of the controls for the right analog is displayed stating ‘mouse motion’ and a sensitivity of 50.

**Actual Results:**

1. Preview of the controls for the right analog is displayed stating ‘mouse motion’ and a sensitivity of 50.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

desktop-app/src/ui/components/customizeModal.tsx: 1-277

desktop-app/src/ui/components/keyboard.tsx: 1-374

desktop-app/src/ui/components/mouse.tsx: 1-106

desktop-app/src/ui/components/sensitivitySlider.tsx: 1-47

3.5

**Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in the voice command ‘shoot’s row.
3. Go to the Keyboard tab if not already there.
4. Unselect all selected keys, select the R key.
5. Press the Save Changes button.

**Expected Results:**

1. Preview of controls is displayed with the R key mapped to the shoot voice command.

**Actual Results:**

1. Preview of controls is displayed with the R key mapped to the shoot voice command.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

desktop-app/src/ui/components/customizeModal.tsx: 1-277

desktop-app/src/ui/components/keyboard.tsx: 1-374

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.6

**Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in the stop voice command’s row.
3. Press the mouse tab and then select Left click.
4. Press the Save Changes button.

**Expected Results:**

1. Preview of controls is displayed with the left click mapped to the shoot voice command.

**Actual Results:**

1. Preview of controls is displayed with the left click mapped to the shoot voice command.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

desktop-app/src/ui/components/customizeModal.tsx: 1-277

desktop-app/src/ui/components/keyboard.tsx: 1-374

desktop-app/src/ui/components/mouse.tsx: 1-106

controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-107

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.7

**Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in the accelerometer motion’s row.
3. Select the keyboard tab if not already selected.
4. On the screen Click E > Next > D > Next > S > Next > F > Save Changes.

**Expected Results:**

1. Preview of the controls for the accelerometer motion is displayed with the following directions mapped to the keys: UP->E, LEFT->S, DOWN->D, RIGHT->F.

**Actual Results:**

1. Preview of the controls for the accelerometer motion is displayed with the following directions mapped to the keys: UP->E, LEFT->S, DOWN->D, RIGHT->F.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

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controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.8

**Test Steps:**

1. Click Start > Customize on the PC
2. Click Customize in the accelerometer motion’s row.
3. Select the mouse tab if not already selected.
4. Set the sensitivity to 40 and click Save Changes.

**Expected Results:**

1. Preview of the controls for the accelerometer motion is displayed stating ‘mouse motion’ and a sensitivity of 40.

**Actual Results:**

1. Preview of the controls for the accelerometer motion is displayed stating ‘mouse motion’ and a sensitivity of 40.

**Coverage:**

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desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

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controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.9

**Test Steps:**

1. Click Start > Customize on the PC.

**Expected Results:**

1. All rows in the customize menu have a mapping preset.

**Actual Results:**

1. All rows in the customize menu have a mapping preset.

**Coverage:**

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desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

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desktop-app/src/ui/pages/start.tsx: 1-29

3.10

**Test Steps:**

1. Click Start > layout-one > Customize > Play on the PC.
2. Scan the QR-Code using your phone allowing redirection to the encoded link.
3. Accept the security warnings displayed by your browser (if any).

**Expected Results:**

1. Layout 1 appears on the phone. Layout 1 has no analog input sticks.

**Actual Results:**

1. Layout 1 appears on the phone. Layout 1 has no analog input sticks.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573

desktop-app/src/electron/util.ts: 1-123

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desktop-app/src/ui/models.ts: 1-338

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controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

3.11

**Test Steps:**

1. Click Start > layout-two > Customize > Play on the PC.
2. Scan the QR-Code using your phone allowing redirection to the encoded link.
3. Accept the security warnings displayed by your browser (if any).

**Expected Results:**

1. Layout 2 appears on the phone. Layout 2 has 2 analog input sticks.

**Actual Results:**

1. Layout 2 appears on the phone. Layout 2 has 2 analog input sticks.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

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desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

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desktop-app/src/ui/pages/start.tsx: 1-29

controller-app/src/main.tsx: 1-11

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controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutTwo.tsx: 1-279

4.1

**Test Steps:**

1. Click Start > layout-one > Customize on the PC.
2. Ensure that the left arrow is mapped to the ‘a’ key.
3. Press Play.
4. Scan the QR-Code using your phone allowing redirection to the encoded link.
5. Accept the security warnings displayed by your browser (if any).
6. Open the notepad app on your PC and create a new note.
7. Press the left arrow button on the phone.

**Expected Results:**

1. The letter ‘a’ is written to the notepad application.

**Actual Results:**

1. The letter ‘a’ is written to the notepad application.

**Coverage:**

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desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573, 490-493

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/electron/controller-inputs/ButtonInput.ts: 1-44

desktop-app/src/electron/controller-inputs/ControllerInput.ts: 1-49

desktop-app/src/ui/App.tsx: 1-24

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desktop-app/src/ui/models.ts: 1-338

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controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutOne.tsx: 1-179

4.2

**Test Steps:**

1. Click Start > layout-two > Customize on the PC.
2. Ensure that the left analog stick is mapped to the ‘WASD’ keys in order.
3. Press Play.
4. Scan the QR-Code using your phone allowing redirection to the encoded link.
5. Accept the security warnings displayed by your browser (if any).
6. Open the notepad app on your PC and create a new note.
7. Move the left analog up, then left, then down, then right on the phone.

**Expected Results:**

1. The letter ‘w’ is printed multiple times followed by the letter ‘a’ then ‘s’ and then ‘d’.

**Actual Results:**

1. The letter ‘w’ is printed multiple times followed by the letter ‘a’ then ‘s’ and then ‘d’.

**Coverage:**

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desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573, 479-488,

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/electron/controller-inputs/AnaogInput.ts: 1-144

desktop-app/src/electron/controller-inputs/ControllerInput.ts: 1-49

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desktop-app/src/ui/models.ts: 1-338

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desktop-app/src/ui/pages/connections.tsx: 1-114

desktop-app/src/ui/pages/customize.tsx: 1-250

desktop-app/src/ui/pages/start.tsx: 1-29

controller-app/src/main.tsx: 1-11

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controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutTwo.tsx: 1-279

4.3

**Test Steps:**

1. Click Start and ensure voice commands are checked.
2. Click layout-two > Customize on the PC.
3. Ensure that the voice command ‘stop’ is mapped to the left click.
4. Press Play.
5. Scan the QR-Code using your phone allowing redirection to the encoded link.
6. Accept the security warnings displayed by your browser (if any).
7. Hover your mouse over the ‘Back To Customize’ button.
8. Say ‘stop’ to your phone.

**Expected Results:**

1. JoyLink goes back to the customization menu on the PC.

**Actual Results:**

1. JoyLink went back to the customization menu on the PC.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

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desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

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desktop-app/src/electron/controller-inputs/ControllerInput.ts: 1-49

desktop-app/src/electron/controller-inputs/MotionControllerInput.ts: 1-116

desktop-app/src/ui/App.tsx: 1-24

desktop-app/src/ui/main.tsx: 1-11

desktop-app/src/ui/models.ts: 1-338

desktop-app/src/ui/pages/chooseLayout.tsx: 1-151

desktop-app/src/ui/pages/connections.tsx: 1-114

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controller-app/src/main.tsx: 1-11

controller-app/src/App.tsx: 1-96, 108-127

controller-app/src/components/DPad.tsx: 1-214

controller-app/src/components/GameButton.tsx: 1-133

controller-app/src/pages/LayoutTwo.tsx: 1-279

4.4

**Test Steps:**

1. Click Start and checkbox motion controls.
2. Click layout-one > Customize on the PC.
3. Ensure that the accelerometer motion is mapped to the mouse motion.
4. Press Play.
5. Scan the QR-Code using your phone allowing redirection to the encoded link.
6. Accept the security warnings displayed by your browser (if any).
7. Steer your phone left and then right.
8. Tilt your phone back and forth.

**Expected Results:**

1. The mouse moves left and right in the direction the phone is steered.
2. The mouse moves up and down in the direction the phone is tilted.

**Actual Results:**

1. The mouse moves left and right in the direction the phone is steered.
2. The mouse moves up and down in the direction the phone is tilted.

**Coverage:**

desktop-app/src/electron/server.ts: 1-48

desktop-app/src/electron/preload.ts: 1-78

desktop-app/src/electron/pathResolver.ts: 1-35

desktop-app/src/electron/controllers/ControllerLayout.ts: 1-19

desktop-app/src/electron/main.ts: 1-478, 517-573, 501-516

desktop-app/src/electron/util.ts: 1-123

desktop-app/src/electron/controller-inputs/AnaogInput.ts: 1-144

desktop-app/src/electron/controller-inputs/ButtonInput.ts: 1-44

desktop-app/src/electron/controller-inputs/ControllerInput.ts: 1-49

desktop-app/src/electron/controller-inputs/MotionControllerInput.ts: 1-116

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desktop-app/src/ui/App.tsx: 1-24

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desktop-app/src/ui/models.ts: 1-338

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controller-app/src/pages/LayoutOne.tsx: 1-179