**Microcontroller Unit Test**

**Test ID:** Test Case 1.7

**Test Description:**

The Microcontroller is the brains of the nocLock. To ensure that the Microcontroller is working correctly when programmed, we have created this all inclusive unit test. The test will step the Microcontroller through the reset state, the programming state, the unlock state, and then back into the reset state. Upon successful completion of this test, the operator will know the Microcontroller is working correctly.

**Equipment:**

1. Oscilloscope
2. Digital Multi-meter
3. Function Generator
4. Two Channel DC Power Supply
5. AVR Dragon Board

**Part(s)**

* 1. Assembled Microcontroller circuit

**Reference:**

1. T02\_nocLock\_rev3.sch (for circuit reference)

**Setup:**

Ports B0, B1, and B6 are active high input buttons. B0 is the program button, B1 is the action button, and B6 is the reset button. These pins should be grounded initially. Port ADC5 is the A to D converter for the piezo buzzer, which should also be grounded initially. Finally, ports B2, B3, and B4 are output pins. B2 is the solenoid driver, B3 is the green LED, and B4 is the red LED. The Microcontroller should be programmed with the executable compiled from nocLock.c. Initially, port B4 should be outputting 5V, while ports B2 and B3 are outputting 0V.

**Procedure:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Action** | **Expected Result** | **Pass/**  **Fail** | **Comments** |
| 1. | Pulse port B1 with 5V DC to simulate action button press | Port B2 and port B3 output 5V for five seconds. Port B4 outputs 0V.  After five seconds, port B2 and B3 output 0V and port B4 outputs 5V. |  |  |
| 2. | Pulse port B0 with 5V DC to simulate program button press | Ports B3 and B4 output 5V |  |  |
| 3. | Use the function generator to create a square wave that goes to 3V DC for 50ms at 500ms intervals, four times. | N/A |  |  |
| 4. | Pulse port B0 with 5V DC to simulate program button press | Port B4 output 0V, and B3 output 5V for two seconds. After two seconds, B3 and B4 go back to 5V |  |  |
| 5. | Use the function generator to create a square wave that goes to 3V DC for 50ms at 500ms intervals, four times. | N/A |  |  |
| 6. | Pulse port B0 with 5V DC to simulate program button press | Port B4 output 0V. Port B3 output 5V for two seconds. After two seconds, port B3 output 0V and B4 output 5V. The knock is now stored in EEPROM. |  |  |
| 7. | Pulse port B1 with 5V DC to simulate action button press | Port B3 and B4 output 5V |  |  |
| 8. | Use the function generator to create a square wave that goes to 3V DC for 50ms at 500ms intervals, four times. | N/A |  |  |
| 9. | Pulse port B1 with 5V DC to simulate action button press | Port B2 and port B3 output 5V for five seconds. Port B4 outputs 0V.  After five seconds, port B2 and B3 output 0V and port B4 outputs 5V. |  |  |
| 10. | Pulse port B6 with 5V DC to simulate reset button press | EEPROM cleared. Microcontroller returns to original state from step 1. |  |  |
| 11. | Pulse port B1 with 5V to simulate action button press | Port B2 and port B3 output 5V for five seconds. Port B4 outputs 0V.  After five seconds, port B2 and B3 output 0V and port B4 outputs 5V. |  |  |