Test Cases

NanoRiego

1. Introduction

This document enumerates specific test cases derived from the system's functional, non-functional, and interface requirements, as outlined in the URS and SRS. Each test case specifies input conditions, expected outcomes, and the actual result. These tests verify the correct behavior of hardware, firmware, and the mobile app under various conditions.

2. Test Cases

2.1 Functional Testing

TC ID	Title	Description	Input	Expected Output	Test Level	Status
TC-U01	Command Parsing	Validate the command parser processes Bluetooth commands accurately	M:Z1:ON	Internal function correctly interprets and dispatches	Unit	Pass
TC-U02	RTC Time Management	Validate low-level time set/read functionality via I2C	Write time: 12:34	RTC stores and returns 12:34	Unit	Pass
TC-U03	Relay Control Logic	Verify that relay control logic activates only one valve at a time	Activate Z1 + Z2 sequentially	System ensures mutual exclusion of relay activation	Unit	Pass
TC-F02	Manual Pump Activation	Confirm pump activation in tandem with any active zone	Tap ON for any zone	Pump relay activates simultaneously	Integration	Pass
TC-F04	Time Sync from Android	Ensure RTC synchronizes with Android system time	Tap sync time	Arduino clock updates to match phone time	Integration	Pass
TC-F01	Manual Valve Activation	Verify each irrigation zone can be manually activated via the app	Tap ON for Zone 1	Zone 1 relay activates; app status indicator turns green	System	Pass
TC-F03	Programmed Schedule	Validate scheduled irrigation triggers on time	Set schedule for Zone 2 (08:00–08:05)	Zone 2 activates at 08:00, deactivates at 08:05	System	Pass
TC-F05	Auto Reconnection	Verify automatic reconnection after initial Bluetooth pairing	Launch app after pairing	App reconnects automatically to HC-05	System	Pass

2.2 Non-Functional Testing

TC ID	Title	Description	Input	Expected Output	Test Level	Status
TC-NF02	Hardware	Validate behavior	New relay	System functions	Integration	Pass

TC ID	Title	Description	Input	Expected Output	Test Level	Status
	Replacement	with relay module replacement	board	without requiring reprogramming		
TC-NF01	Power Recovery	Ensure configuration persists after power loss	Power cycle device	Previously set schedule remains intact	System	Pass
TC-NF03	Usability – App Feedback	Evaluate UI behavior during loss of connection	Disconnect device	Controls become inactive; connection indicator red	UAT	Pass

2.3 Interface Testing

TC ID	Title	Description	Input	Expected Output	Test Level	Status
TC-IF02	UI Button Mapping	Confirm each zone button triggers the corresponding relay	Tap each zone button	Matching relay LED lights up accordingly	Unit	Pass
TC-IF01	Bluetooth Pairing	Verify Bluetooth pairing process using default PIN	Tap 'Pair' in app, enter PIN 1234	HC-05 appears as 'Connected' in Android settings	Integration	Pass
TC-IF03	Time and Date Widgets	Validate user input updates RTC via the app	Set date/time in app	RTC module reflects new values accurately	Integration	Pass

4. Notes

- All tests executed on April 10–12, 2025

- Test environment included standard NanoRiego hardware + Android 10+ device

- Logs and screenshots archived in test-results/ folder on GitHub

5. Conclusion

All tests were executed successfully and passed as per their expected criteria. The system is validated for production deployment in small-scale environments.

This document will be updated alongside firmware or app revisions to include new features and test validations.