

Implementation Guide

NanoRiego

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1. Introduction

This Implementation Guide provides detailed instructions for assembling, configuring, and deploying the NanoRiego system. It includes practical steps for hardware setup, software flashing, Android app installation, and system integration. This guide is intended for developers, engineers, and technical users performing the initial deployment or maintenance of the system.

2. Bill of Materials (BOM)

Component	Quantity	Source	Notes
NanoRiegoPCB	1	GitHub (MikeMakes)	Custom printed circuit board
Arduino Nano	1	Amazon/AliExpress	ATmega328-based board
HC-05 Bluetooth	1	Amazon/AliExpress	3.3V logic; configure via AT cmds
DS1307 RTC Module	1	Amazon/AliExpress	Includes backup battery
4-Relay Module	1	Amazon/AliExpress	10A 250VAC / 30VDC rating
Resistors (R1, R2)	1 each	3.62k Ω , 7k Ω	Logic level shifter for HC-05
USB-C Cable	1	—	For power and programming

3. Hardware Assembly

1. **Soldering:** Mount all modules onto the NanoRiegoPCB following the printed layout.
2. **Bluetooth Logic Shifting:** Install R1 (3.62k Ω) and R2 (7k Ω) as voltage divider between Arduino TX and HC-05 RX.
3. **Relay Pins:** Adjust for newer relay modules that may not align with the original PCB footprint; bridging may be required.
4. **Power Supply:** Use USB-C or external DC source (12V max) for the system.

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4. Firmware Flashing

1. Connect Arduino Nano via USB.
2. Open Arduino IDE and load the NanoRiegoPIO sketch from the GitHub repository.
3. Select the correct board and port under Tools.
4. Click Upload.
5. Monitor serial output to confirm correct initialization and RTC detection.

5. Android Application Deployment

1. Clone the NanoRiegoAPP Android Studio project from GitHub.
2. Build and install the APK on an Android device (Android 7+ recommended).
3. Grant necessary Bluetooth permissions upon first launch.
4. Use the in-app Bluetooth menu to pair with the HC-05 (default PIN: 1234).
5. Enable "auto-connect" and "time sync" for smooth operation.

6. System Initialization

1. Power the assembled system via USB or 12V adapter.
2. Open the app and connect to the HC-05 module.
3. Configure time and irrigation schedules via app UI.
4. Run a manual cycle to validate relay operation and zone mapping.

7. Safety and Installation Notes

- Use a DIN-rated auxiliary relay to drive the hydraulic pump to mitigate high-current risks.
- Ensure all valves and pump share a common ground.
- Disconnect power before handling wiring or making electrical modifications.

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8. Testing Checklist

- Bluetooth connects successfully and auto-reconnects
- RTC retains time during power loss
- Relays switch correctly and drive respective zones
- Manual and scheduled modes operate as expected
- EEPROM saves and restores configuration

9. Troubleshooting

Symptom	Possible Cause	Solution
App stuck on connect	HC-05 not paired	Pair in Android Bluetooth settings
RTC shows wrong time	Sync not enabled	Enable auto-sync in app
Valves not responding	Incorrect relay mapping	Check wiring and relay pinout
Schedule not executing	RTC not detected	Confirm I2C lines and power

10. Resources

- GitHub Repo: github.com/MikeMakes/nanoRiego
- Arduino Libraries: EEPROM, Wire, SoftwareSerial
- Android Studio Documentation

This guide shall evolve in alignment with future hardware revisions, firmware updates, and user feedback.