

PROCESS ENGINEERING · EMBEDDED & IOT

Dhimas Ardinata Putra Pamungkas

Firmware and device integration for real-world IoT systems.

Selected projects in firmware development, sensor and actuator integration, device communication, and field validation.

LOCATION

Senai, Johor, Malaysia

EDUCATION



BACHELOR OF APPLIED
ENGINEERING (S.T.R.T.) ·
TELECOMMUNICATIONS
ENGINEERING

FOCUS

Firmware · IoT · Device
integration

CONTACT

dhimasardinatapp@gmail.com
+62 857-0799-6402 (ID/WhatsApp)
+60 11-1762-8207 (MY/WhatsApp)

CURRENT ROLE

Process Engineering Support
Technician · Wiwynn



EMBEDDED SYSTEMS

C/C++ Firmware · Hardware Bring-Up · Field
Validation

ACADEMIC STATUS

Graduated · August 2026

ABOUT ME

Connecting sensors, firmware, networks, and physical equipment.

I work in process engineering at Wiwynn and bring hands-on experience developing embedded firmware and IoT systems, from device integration through field validation.

3.80

GPA on a 4.00 scale

845

TOEIC Listening & Reading

42

field and lab units deployed, tested, or diagnosed

EXPERIENCE

Process Engineering Support Technician

**Wiwynn · Senai, Johor, Malaysia · October 2026 - Present**

- Support process engineering for hyperscale cloud/AI server lines (L6 PCBA) across SMT and DIP; check fixture/tool setups and assist ICT/MDA, BST, and BFT operations.
- Monitor the production line, report deviations, and help process engineers follow up on corrective actions.

Hardware Development Intern

**OmahIoT · Semarang, Central Java, Indonesia · January-July 2025 · Very Good rating**

- Supported IoT implementation from site surveys and hardware assembly through firmware, deployment, testing, and documentation.
- Developed firmware for ESP32, ESP8266, TTGO T-Call, and ATmega328P devices covering sensor acquisition, relay and pump control, displays, RTC, and Wi-Fi/GPRS telemetry.
- Troubleshoot power, wiring, sensor, UART/I²C, modem, connectivity, and data-delivery issues.

CORE CAPABILITIES

- **Firmware:** C/C++, Arduino framework, PlatformIO, state handling, watchdogs, persistent settings, OTA, FreeRTOS-based ESP32 firmware, Zephyr exposure (nRF Connect SDK).
- **Platforms:** ESP32/ESP32-S3, ESP8266/Wemos D1 Mini, TTGO T-Call, ATmega328P.
- **Interfaces:** RS485, Modbus RTU, UART, I²C, SPI.
- **Connectivity:** Wi-Fi, GPRS/LTE, Bluetooth Serial, MQTT, HTTP/HTTPS, REST/JSON.
- **Validation:** serial monitor, multimeter, pin/wiring checks, device testing, Git/GitHub, Python, CMake, and technical documentation.

WORKING METHOD

01**Understand**

Requirements & field conditions

02**Integrate**

MCU, sensors & actuators

03**Validate**

Pins, wiring & data

04**Harden**

Faults, cache & reconnect

05**Document**

Findings & maintenance



ATOMIC · TEAM FINAL PROJECT · VON FLORIST
(KENDAL, CENTRAL JAVA, INDONESIA) · 2025-2026

IoT Orchid Greenhouse Monitoring & Control

A Von Florist system connecting 10 ESP8266 sensor nodes and 2 ESP32 gateway/controllers to monitor greenhouse conditions and control equipment.

Contribution boundary: this was a team final project. The work shown here focuses on device firmware, node-gateway integration, actuator control, connection reliability, and hardware-software validation.



01

Environment

Temperature, humidity, light

02

10 nodesESP8266 + I²C sensors

03

2 gateways

ESP32 + edge control

04

Actuators

Blower, exhaust, dehumidifier

05

Operations

Cloud, cache, OTA, diagnostics

EMBEDDED CONTRIBUTION

- Developed an integrated system with 10 ESP8266 sensor nodes and 2 ESP32 gateway/controllers.
- Integrated temperature, humidity, and light measurements with blower, exhaust fan, and dehumidifier control.
- Implemented thresholds and scheduling, local caching, connection recovery, logging, LCD/RTC/SD card, WebSocket diagnostics, device configuration, and OTA.

ESP8266

ESP32

C++

I²C

Wi-Fi

REST

Local cache

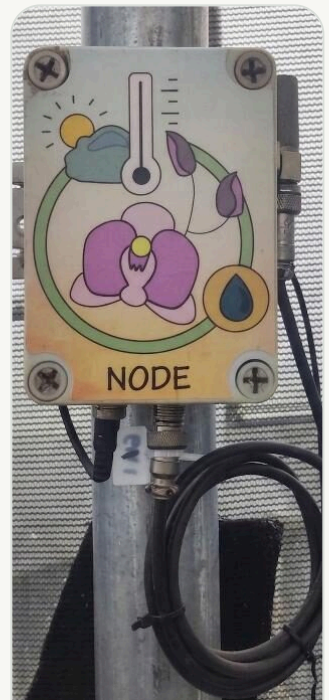
OTA

Field QoS · 10 nodes · 50,400 expected packets · 25 Feb–31 Mar 2026

Node-side store-and-forward caching reduced telemetry loss from 51.98% to 15.45%; 42–44% of delivered data came through the cache. Calculated cache capacity: about 4.97 days at 10-minute sampling (716 records; 100 KB LittleFS; max 143 B/record); OTA payloads up to 751.7 KB.



Gateway and control panel inside their field enclosures.



ESP8266 sensor node installed in the greenhouse area.



OMAHOT · SEMARANG, CENTRAL JAVA, INDONESIA · 2025

Two field devices built for different monitoring needs.

MONIK monitors nutrient solution and controls hydroponic pumps. MOSIBAN measures rainfall with a tipping bucket and sends telemetry for sedimentation and flood monitoring.

01 / MONIK

Hydroponic Monitoring & Control

An internship project combining nutrient-solution and environmental monitoring, a local display, telemetry, and pump control. Implemented and field-tested in Salatiga, Central Java, Indonesia.



Monitoring chain

pH · EC/TDS · water temperature · air temperature/humidity · light · nutrient level · RTC · Nextion → ATmega328P acquisition → ESP8266 Wi-Fi telemetry → API.

Control chain

Data and thresholds → stale/invalid validation → ESP32 nutrient A/B and pH-down pump control → watchdog, persistent settings, reconnect, and OTA.

- Diagnosed a field pH drop to 2.5, traced it to reversed dosing-pump polarity, and corrected the wiring.

ESP32

ATmega328P

ESP8266

pH

EC/TDS

Nextion

Pump control

02 / MOSIBAN

Rainfall Monitoring Device

An ESP32/TTGO T-Call device converting mechanical tipping-bucket events into rainfall data and delivering them through a cellular connection.

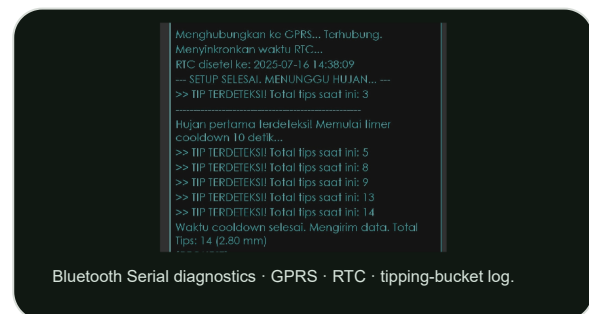
Acquisition

Tipping-bucket interrupt + debounce → tip count → 0.2 mm/tip conversion → RTC timestamp.

Telemetry & diagnostics

SIM800/GPRS → HTTP/JSON server delivery; Bluetooth Serial for local logs; Wi-Fi for OTA.

- Implemented hardware-interrupt debouncing for tipping-bucket acquisition and rainfall telemetry.
- Integrated SIM800/GPRS, DS3231 RTC, HTTP/JSON, and Bluetooth Serial.



ESP32

TTGO T-Call

Tipping bucket

SIM800

GPRS

DS3231

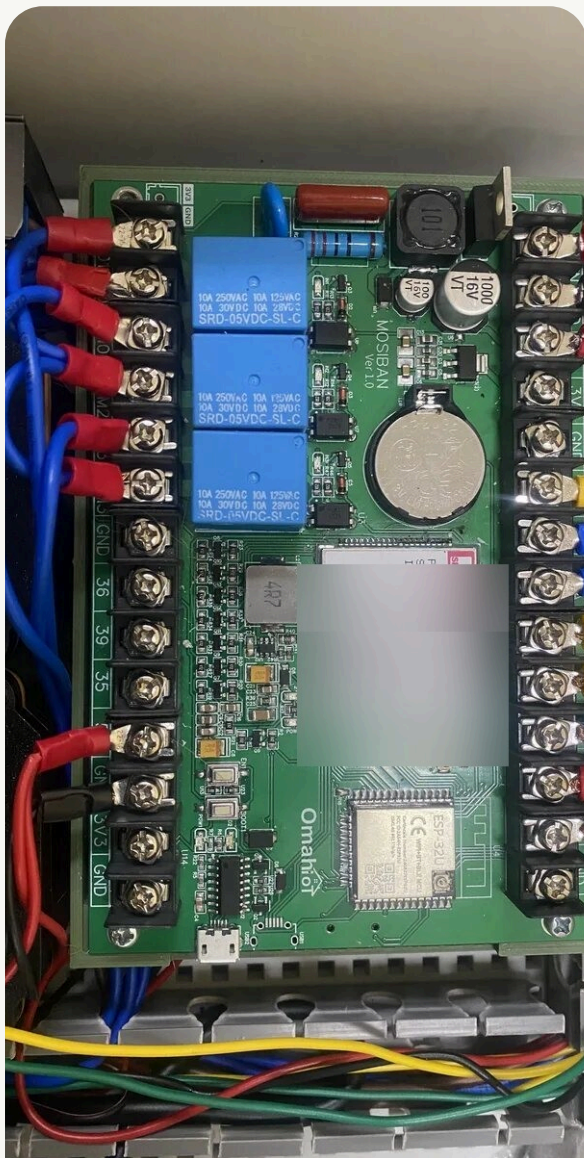
HTTP

OTA



Industrial Hydroponic Monitoring & Control

Firmware and device-validation support for lecturer-led research by Politeknik Negeri Semarang and OmahaIoT. My contribution was technical support, not research ownership.



Custom OmahIoT controller board with ESP32, SIM7600 cellular modem, and relay outputs.

CONTRIBUTION SCOPE

- Supported ESP32 firmware for hydroponic sensor and control integration over RS485/Modbus RTU.
- Integrated UART/I²C peripherals, display, RTC, water-level sensing, SIM7600 modem, and pump control.
- Supported persistent configuration, local monitoring, fault handling, and OTA-oriented firmware maintenance.

RS485 VALIDATION

A separate test firmware was built before full integration so physical-layer and protocol faults could be isolated quickly.

01 · Pinout

Verify UART, DE/RE, and communication direction.

02 · Wiring

Check A/B, ground, power, and termination.

03 · Scan

Scan Modbus device addresses on the bus.

04 · Diagnose

Analyze timeout, framing, baud rate, and response.

ESP32

RS485

Modbus RTU

UART

I²C

SIM7600

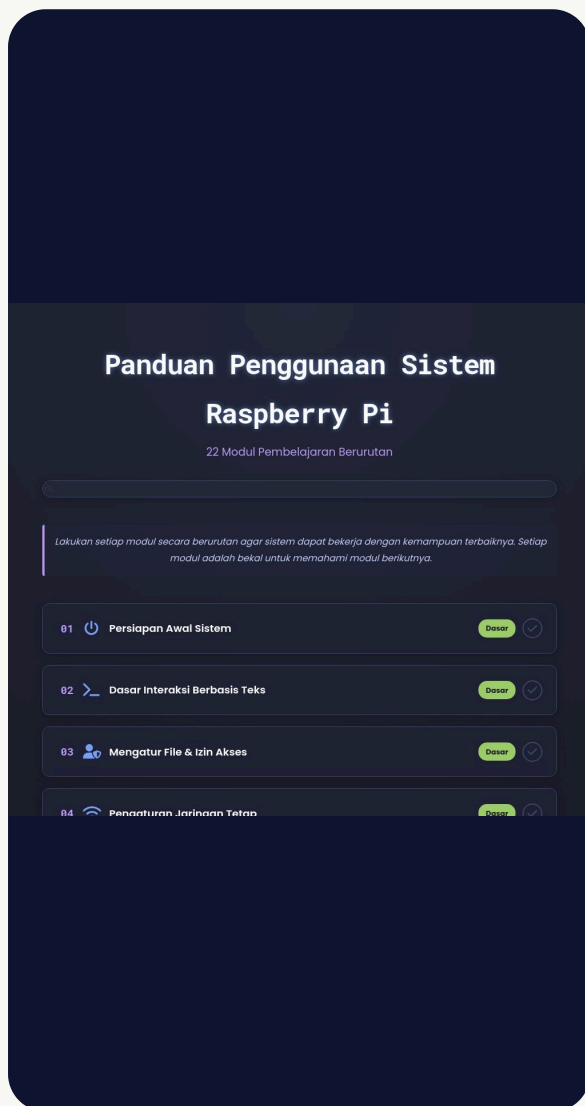
RTC

OTA



22 Raspberry Pi lessons, from fundamentals to advanced topics.

Created 22 Indonesian-language modules with progress tracking for Algorithms & Programming II. [View the module site ↗](#).



FOUNDATION TRACK

OS setup, terminal, networking, Python, GPIO, sensors (HC-SR04, LM35, BH1750), I²C/UART, and Blynk dashboards.

ADVANCED TRACK

Local MQTT brokering (Mosquitto, paho-mqtt), MariaDB logging, multi-Pi networks, IoT hardening, and Flask dashboards.

LAB QA

Diagnosed 11 lab units with per-sensor failure reports to keep the lab units ready for classes.

OPEN-SOURCE CONTRIBUTIONS

Two fixes merged in Arduino-ESP32 Core v3.3.9: [PR #12613](#) · [#12615](#). [EAWS v0.5.1](#) · PlatformIO.

Raspberry Pi

Python

MQTT

MariaDB

Flask

I²C

UART

Linux

CLOSING SUMMARY

Open to collaboration and technical discussions.

I welcome project collaboration and technical conversations about firmware, IoT, device integration, and hardware validation.

SELECTED CREDENTIALS

**Linux Essentials** ↗

Cisco Networking Academy · 7 September 2026

**SCE Automation Fundamentals (PLC)** ↗

Siemens · 6 September 2026

**Six Sigma White Belt** ↗

CSSC · 5 September 2026

**Hardware Components and Troubleshooting** ↗

IBM SkillsBuild · 25 August 2026

**Information Technology Fundamentals** ↗

IBM SkillsBuild · 20 August 2026

**C++ Essentials 1** ↗

Cisco Networking Academy · 24 July 2026

**nRF Connect SDK Fundamentals** ↗

Nordic Semiconductor · 12 May 2026

**TOEIC Listening & Reading · 845/990** ↗

Tested 16 November 2025 · valid until November 2027

**CCNA: Switching, Routing and Wireless Essentials** ↗

Cisco Networking Academy · 10 November 2024

LANGUAGES

Indonesian: native · **English:** professional working proficiency.

LET'S CONNECT

Dhimas Ardinata Putra Pamungkas

Process engineering at Wiwynn, backed by hands-on embedded firmware and IoT system development.

EMAIL

dhimasardinatapp@gmail.com

INDONESIA · WHATSAPP

+62 857-0799-6402

MALAYSIA · WHATSAPP

+60 11-1762-8207

WEB PORTFOLIO

dhimasardinata.netlify.app

GITHUB

github.com/dhimasardinata

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