ERFAN MAHMUD TUSHAR

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PROFESSIONAL SUMMARY

Embedded Systems Engineer with over 5 years of experience writing firmware and designing PCBs for real-world IoT products. Hands-on experience building wireless gateways, developing firmware on microcontrollers using RTOS, and taking board designs from schematic and layout all the way to working hardware. Experienced in configuring commercial LoRaWAN gateways with network servers like ChirpStack and The Things Network (TTN). Skilled in writing clear technical documentation, debugging hardware-firmware issues, and performing basic firmware QA testing. Comfortable deploying systems internationally to solve utility and automation problems.

TECHNICAL SKILLS

Programming Languages	C, C++, MATLAB
Microcontrollers & IDEs	STM32 (STM32CubeIDE), ESP32 (ESP-IDF), AVR, Arduino
Operating Systems & RTOS	FreeRTOS
Hardware & PCB Design	Altium Designer, Autodesk Eagle, Autodesk Fusion 360 (3D CAD)
Hardware Protocols	I2C, SPI, UART, CAN, USB, Ethernet, Modbus RTU/ASCII
Wireless & Connectivity	Wi-Fi, Bluetooth / BLE, LoRa & LoRaWAN, Cellular (2G/3G/4G LTE), OTA Firmware Updates
IoT & Cloud Protocols	MQTT, WebSocket, HTTP
Cloud & LoRaWAN Platforms	AWS IoT Core, ChirpStack, The Things Network (TTN)
Libraries & Desktop Tools	LVGL, LittleFS, Doxygen, Postman, Git/GitHub, MATLAB Simulink
Methodologies	Agile (Scrum), Schematic Capture, PCB Routing, Hardware Debugging, Firmware QA (Basic), Technical Documentation

WORK EXPERIENCE

Senior Firmware & Hardware Developer | Inovace Technologies Ltd. **Jul 2025 - Present**

Dhaka, Bangladesh *Full-Time*

- Designed and built an MQTT-based Modbus RTU Gateway to connect industrial devices to the cloud.
- Wrote firmware that supports 5 different PCB versions (V12 to V17) and legacy SDKs for the TF80/90/TC-20 hardware.
- Refactored the core code and removed outdated dependencies to reduce RAM usage and improve stability on low-resource microcontrollers.
- Developed a fallback internet connection system using GSM, Wi-Fi, and LAN to keep devices online during network dropouts.
- Documented the code structure, APIs, and memory layouts using Doxygen to make it easier for other developers to maintain.

Remote Embedded Systems Developer (Firmware & PCB) | Nexus Fish Network Ltd. **May 2024 - Jun 2025**

Tangail, Bangladesh *Contract*

- Built a LoRa Mesh gateway and address-based communication nodes using ESP32 for reliable local data sharing.
- Created device setup workflows, local storage features, and secure cloud integration for the sensor nodes.
- Developed an IoT aquaculture monitoring system that tracks water health metrics to help fish breeding.
- Designed multi-layer PCBs, debugged hardware issues, and set up backup Wi-Fi/GSM connectivity paths.

Remote Embedded Systems Developer (Firmware & PCB) | Smart Lifestyle Australia Pty. Ltd. **Aug 2023 - May 2024**

Victoria, Australia (Concern of Cynergy AU) *Full-Time*

- Developed ESP-IDF firmware on RISC-V microcontrollers for smart plugs, inverter dongles, EV chargers, and HVAC controllers.
- Built a reusable ESP32 firmware framework with BLE/Wi-Fi provisioning and AWS IoT Core MQTT connectivity, allowing new products to be launched simply by adding their specific hardware drivers.
- Optimized FreeRTOS task scheduling and memory footprints to make consumer appliances more reliable.
- Reviewed PCB layouts, debugged hardware issues, and made changes to ensure the products met quality standards.

Senior Embedded Systems Developer | Padma Smart Technology Ltd. **Sep 2022 - Aug 2023**

Dhaka, Bangladesh (Concern of Wings Investment LLC, USA) *Full-Time*

- Managed end-to-end product design (schematics, PCB layout, component sourcing, and hardware debugging) in collaboration with Chinese manufacturing and production partners.
- Developed FreeRTOS firmware on ARM microcontrollers for smart electricity meters and LoRaWAN communication modules.
- Connected gateways and end-nodes to ChirpStack and TTN (The Things Network) for logging data and updating configurations.

IoT & Embedded Systems Developer | Padma Smart Technology Ltd. **Jul 2020 - Aug 2022**

Dhaka, Bangladesh *Full-Time*

- Kept municipal LoRa gateways, water meters, and electric meters running smoothly with minimal downtime.
- Worked with Dhaka WASA to install and monitor groundwater level sensors in pump areas.
- Travelled to Zanzibar, Tanzania, to deploy and configure a LoRaWAN network for the Zanzibar Water Authority (ZAWA), enabling island-wide smart water metering.

IoT Engineer | CPSD Technologies Ltd. **Nov 2019 - Jun 2020**

Dhaka, Bangladesh *Full-Time*

- Designed and tested Wi-Fi gang switches and infrared control hubs for smart homes.
- Simulated circuits, designed PCBs, and debugged firmware to make sure products worked reliably.

EDUCATION

M.Sc. in Satellite Communication Engineering **Jun 2022 - Present**

Aviation and Aerospace University, Bangladesh (AAUB)

Field of study: Space and satellite communication systems

B.Sc. in Electrical & Electronic Engineering **2013 - 2017**

Mymensingh Engineering College (Affiliated with the University of Dhaka)

Graduation Year: 2017

HONOURS AND AWARDS

Semifinalist (Mentor) | 8 KG International Robo War, Techfest, IIT Bombay, India (2020)

Runner Up (Team Leader) | National ICT Day Robo Fight Contest, A2I Innovation Lab, Bangladesh (2018)

REFERENCES

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Relation: Academic

Geoff Lamb

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