

## VOLETI BALA BHASKER

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### Professional Summary

Embedded Firmware Engineer with 6.5 years of experience in embedded systems design, development, integration, and validation for medical and laboratory equipment. Experienced in driving firmware projects, mentoring team members, and working closely with cross-functional teams. Skilled in microcontroller architectures, firmware development, hardware-software integration, schematic review and maintaining documentation aligned with ISO 13485, ensuring compliance with IEC 60601 standards.

### Technical Skills

- **Embedded Platforms:** STM32 (F1xx, F4xx, F2xx), PIC18F, Raspberry Pi 4B, ESP32, ATMEGA328, ATMEGA256
  - **Programming Languages:** Embedded C, Python
  - **Middleware / RTOS:** FreeRTOS
  - **IDE & Tools:** STM32CubeMX, STM32CubeIDE, Keil µVision, MPLAB IDE, Arduino IDE, Proteus, Altium Designer, Falstad Simulator
  - **Debuggers:** ST-LINK V2, JTAG, PICKIT 3.0 and PICKIT 4.0
  - **Protocols:** UART, I2C, SPI, RS-485, Single Wire
  - **Sensors:** NTC, PTC, PT100, LM35, Reed Switches, Photo Interrupters, Laser Sensors, Capacitive Touch, Inductive Proximity
  - **Interfaces:** GPIO, ADC, DAC, PWM, Timers, DMA, Interrupts
  - **Measurement Equipment:** Oscilloscopes, Logic Analyzers, Multimeters
  - **Display Interfaces:** LCD, OLED, HDMI
  - **Compliance:** ISO 13485, IEC 60601
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### Professional Experience

#### Embedded Firmware Engineer

Pathnsitu Biotechnologies Pvt. Ltd | November 2018 – Present

- Key contributor responsible for guiding project design & development and mentoring team members.
- Designed project architectures, developed and tested firmware modules, and performed hardware bring-up and system integration.
- Collaborated with cross-functional teams during the design and development phase, contributing to system integration, testing, debugging, and optimization.
- Gathered and documented stakeholder requirements, translating them into detailed technical specifications.
- Managed documentation, testing logs, and quality checks aligned with medical device standards.

## Key Projects

### Project 1: Automation Stainer System for Pick-and-Place of Rack into Reagent Jars

- Architected firmware for an automated pick-and-place robotic stainer system based on STM32F429.
- Implemented UART-based communication with Host-PC and console debugging.
- Developed stepper motor control with configurable acceleration/deceleration profiles for smooth and reliable motion.
- Integrated rotary encoders for closed-loop position feedback and opto-sensors for homing.
- Designed PWM-based heater control and configured multi-channel ADCs to monitor multiple temperature and liquid level sensors.
- Implemented external interrupt handling for alarms and emergency stops to ensure operational safety.
- Collaborated with hardware, mechanical, and software GUI teams to ensure seamless integration and validation.
- Documented design and verification activities in compliance with ISO 13485 and IEC 60601 standards.
- Supported complete system bring-up, mechanical integration, testing, and debugging.

### Project 2: Automated Vacuum System

- Designed firmware architecture for a dual-controller system: Master PCB (Host communication, coordination) and Slave PCB (sensor and peripheral control).
- Implemented robust UART-based communication protocols for Host ↔ Master and Master ↔ Slave links.
- Developed a structured command protocol in collaboration with the Software GUI team.
- Programmed control logic for solenoid valve operations and heater control via PWM.
- Configured multi-channel ADCs to monitor 8 temperature sensors and liquid level sensors for accurate real-time feedback.
- Actively collaborated with mechanical, hardware, and GUI teams to ensure alignment and smooth execution.
- Reduced prototype costs and accelerated development by preparing in-house test PCBs using bare boards and off-the-shelf module boards.
- Conducted comprehensive testing, debugging, and validation to ensure reliability and robust system performance.

## Certifications

- Mastering RTOS: Hands-on FreeRTOS with STM32Fx (*Udemy*)
- Master Microcontroller and Embedded Driver Development (MCU1) (*Udemy*)
- Embedded Systems Programming on ARM Cortex-M3/M4 Processor (*Udemy*)

## Awards & Recognition

- **Awarded "The Ultimate Contributor" at Pathnsitu Biotechnologies Pvt. Ltd. in 2023**

*In recognition of significant contributions to product development, cross-functional collaboration, and successful delivery of critical projects.*

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## Educational Qualification

- **B.Tech in Electronics & Communication Engineering**  
VCET, Hyderabad, Telangana | 2012 – 2016
- **Intermediate (MPC)**  
Narayana Junior College, Hyderabad | 2010 – 2012
- **SSC (Secondary School Certificate)**  
Sri Vidya Model High School, Hyderabad | 2010