

SARATH KUMAR S

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CAREER OBJECTIVE:

A seasoned Embedded Developer with a proven track record in designing, developing, and optimizing embedded systems seeking challenging opportunities to leverage expertise in hardware design, firmware development, and system integration to drive innovation and success in cutting-edge projects.

EDUCATION:

Course: Program in Embedded Systems for EV Applications, Skill- Lync. (2022)

BSC, Electronic Communication And Science –SCP Jain-Minjur | B grade (2016)

12th | GOVT Higher Secondary School- Madharpakkam |60% (2012)

10th | GOVT Higher Secondary School-Chennai | 60% (2010)

PROFESSIONAL EXPERIENCE

Junior Engineer – Embedded Systems

Sustech Innovations, Hyderabad

Feb 2024 – Present (2+ Years)

As a core member of the embedded development team, I contributed extensively to the design, development, testing, and field deployment of STM32-based metering controller solutions used in real-time electrical energy monitoring and industrial automation systems. My responsibilities were both hardware- and firmware-focused, enabling a full-stack embedded role:

Hardware & Circuit Integration:

- Worked closely on the STM32F373VCT6-based metering controller board, handling system design for voltage and current measurement circuits using MCP6002 operational amplifiers, passive filters, and external ADC signal conditioning paths.
- Interfaced with CT (Current Transformers) and PT (Potential Transformers) via multi-stage analog conditioning circuits, ensuring accurate phase alignment, gain scaling, and differential input protection for the ADC pins of STM32.
- Verified analog front-end components: diode clamping, RC filtering, biasing networks, and reference voltage control using REF2030-Q1 precision ICs, ensuring system stability across varying loads.
- Supported schematic review and PCB design using OrCAD and Allegro, understanding component footprints, track clearances, net connections, and layer stackups—especially in high-voltage and analog sections.
- Involved in configuring RTC subsystem using a 32.768kHz crystal oscillator, validating the VBAT rail and maintaining clock continuity during power loss.

- Participated in cross-domain interfacing, handling op-to-isolated communication (6N137), RS-232 serial interface (MAX232), and RJ-11-based external connections for communication between the controller and external devices.

Firmware Development:

- ◆ Developed real-time firmware in C using STM32CubeIDE and Keil, writing modular code for: ADC data acquisition and signal calibration.
- ◆ LCD control (16x2 and graphical) with busy-flag checking, data writing, and display updates.
- ◆ UART, SPI, and I2C drivers to interface with peripherals such as EEPROM, energy meters, RTC and sensors.
- ◆ Interrupt-driven communication for timely data acquisition and alert handling.
- ◆ Implemented software-based gain compensation and RMS calculation for voltage and current readings, using ADC data and algorithmic filtering.
- ◆ Integrated RTC-based logging for timestamped event recording and real-time clock display on LCD.
- ◆ Created a command-based serial protocol over UART for configuration and diagnostics via PC serial tools.
- ◆ Designed firmware boot-up routines that validated power rails (AVDD/DVDD), ADC readiness, EEPROM availability, and clock source locking.

Testing, Debugging & Validation:

- Conducted extensive bench-level testing, using:
 - Oscilloscopes to validate analog waveforms and op-amp output stability.
 - Multimeters for verifying voltage rails and component-level measurements.
 - Simulated sensor inputs (CT/PT) and monitored corresponding ADC results to tune scaling constants in firmware.
- Used ST-Link for debugging via SWD (SWDIO/SWCLK), placing breakpoints and monitoring variable behavior in real-time.
- Participated in aging tests, validating long-duration stability of RTC, LCD, and sensor readings.
- Assisted in developing test jigs and simulation environments in Proteus to verify logical correctness before hardware deployment.
- Collaborated with the QA and field testing teams to identify field issues and patch them through firmware updates.

Documentation & Collaboration:

- Created complete documentation sets including:
 - Block diagrams, signal flowcharts, and pinout descriptions.
 - BoM (Bill of Materials) with sourcing and part number mapping.
 - Wiring diagrams for hardware technicians.
 - Firmware user guide and test logs for validation reports.
- Actively participated in design reviews, sprint meetings, and version control via Git-based repositories for collaborative firmware development.

TECHNICAL SKILLS

Category	Details
Languages	Embedded C, C.
IDEs & Tools	STM32CubeIDE, Keil uVision, Arduino IDE, Proteus, Tinkercad, OrCAD, Allegro
Microcontrollers	STM32F103, STM32F373, ESP32, Arduino Uno, AVR
Peripheral Interfaces	GPIO, ADC, DAC, UART (TTL/RS232/Opto-isolated), SPI, I2C, CAN, RTC, Timers, External Interrupts, PWM, 4x4 Keypad, LCD (16x2/GLCD), Flash Memory (SPI)
Communication Protocols	LoRa (SX1278), Bluetooth (HC-05/ESP32), Wi-Fi (ESP32), TCP/IP, RS-232, Opto-isolated UART
Power & Signal Design	AVDD/DVDD power domains, LM1117 3.3V regulator, VBAT RTC backup, analog signal conditioning using MCP6002, clamping, filtering, biasing
Simulation & Debugging	Proteus, ST-Link, Logic Analyzer, Multimeter, CRO, Breakpoint debugging

ACHIEVEMENTS AND CERTIFICATION:

Introduction to Embedded C Essentials, Skill-Lync Centre
(2022) Fundamentals of Embedded Systems, Skill-Lync Centre
(2022) AVR Bare Metal Programming, Skill-Lync Centre (2022)
Software Verification and Validation, Skill-Lync Centre (2022)

LANGUAGES:

English (Professional Proficiency)
Telugu (native Proficiency)
Tamil

Personal Strengths:

Self- Motivated Quick Learn
StressTolerance
Leadership

Personal Profile:

Father Name : Srinivasan
Mother Name :Kanimozhi S

Date of Birth :19-12-1994
Gender :Male
Marital Status : married
Nationality : Indian
Languages known : Telugu Tamil, English,

DATE : (SARATH KUMAR S)
PLACE :