**Rahul Mankumbare**
**rahul.mankumbare91@gmail.com**
**9922476277**

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## Objective:

Seeking full time job in the field of Electronics and Embedded Engineering as a Firmware Driver/Applications Engineer.

## Work Experience:

**TCS (IDC Technologies)**                                   **Sept 2017 – Till Date**
**Role: Sr. Embedded Firmware Developer**

**Sphier Unified Solutions Pvt Ltd, Pune**
**Role: Embedded Firmware Developer**                **Aug 2013 – Sept 2017**

## Profile Summary:

- 5+ years of experience in Product Firmware Development, Project Execution & Engineering, Also developing, debugging and maintaining embedded systems projects.
- Experience in working different product category includes Automotive, Railway, Defence, industrial and agricultural projects.
- Experience working on different microcontroller architecture includes Dual core, Cortex M4, M3, M0, ARM7, 8051
- Extensive Full Life Cycle experience in embedded system development and implementation including Requirement analysis, System Architecting, Firmware Development, Testing, Debugging, Maintenance and Documentation.
- Strong ability to write detailed engineering specifications.
- Excellent communication skills and profound ability and desire to work in a team environment.
- Coordinate and lead the Technical Review process for project.

## Technical Skills:

- **Software Development:** Embedded C.
- **IDE:** S32 Design Studio, KEIL5, 4, 3, Keil C51, Mikro C Pro for ARM, Visual TFT, ST Cube, PSoc Creator, Eclipse. Polyspace bug finder.
- **Debugger:** ST link, Multilink-Universal PE micro , NU-Link Debugger
- **Protocols:** Ethernet-UDP, MODBUS-RTU, CAN, OBD-ISO157654-3, USB, SPI, I2C, RS232, RS485.
- **Compilers :** Mikro C, GCC
- **Microcontroller:** Dual Core, ARM Cortex M4, M3, M0
- **Development Tools:** PCAN View, Modscan, Wireshark, SVN.

## Project Experience:

1) **Bidirectional DC-DC Convertor - Automotive**
**Duration –** Sep 17 - present
**Environment/Technology:** S32 Design studio for ARM, CPLD.

**Role & Responsibilities:**   Firmware developer
- CAN communication
- Interfacing with CPLD using SPI.
- PWM generation for dual active bridge.
- ADC driver development for 28 Analog channels.

**Project description:**
Bidirectional DC-DC converter used in two modes. In boost mode it converts 12 V to 400 V. In buck mode it converts 400 V to 12 V. It uses PID algorithm to achieve the stability. Phase shift in H bridge MOSFETS along with close loop Algorithm controls the power.

### 2) Auxiliary Power Unit(APU) – Indian Railways
**Duration – 1 year**
**Environment/Technology:** Micro C for ARM, Visual TFT, Wireshark.

**Role & Responsibilities:** Firmware developer.

- UDP communication with Locomotive control system
- Interfacing with USB, SD card, EEPROM, RS485, GPS, and GSM.
- Development of control algorithm for Auxiliary power unit
- Client interaction with teams of RDSO, DLW Varanasi, Siemens, EMD, COOPER, and UAPL.

**Project description:**

APU is self-contained system with its own diesel engine coupled to low capacity compressor and alternator to maintain main reservoir pressure, charge battery, operate driver cabin HVAC system and other small loads. The main engine is started only when the locomotive is actually required for movement or traction.
The control system on the locomotive continuously monitors the locomotive battery status and other important parameters like MRPR loco IDLING status, Engine temperatures etc. If the loco idling time is more than 10 minutes, the system shuts down the main engine and run APU engine. APU in diesel locomotives which will result in saving of more than Rs 20 lakh per locomotive annually.

### 3) Auto Transfer Switch (ATS) -- Diesel Generator
**Duration – 6 months**
**Environment/Technology:** Keil uVision, Nu-Link Debugger.

**Role & Responsibilities:** Driver developer.

- MODBUS – RTU driver development
- Testing with Deep-sea controller

**Project description:**

The Auto transfer switch control unit is for emergency stand-by applications with two supply sources, S1 and S2. It will monitor the voltage and frequency of the supply from two different sources, generally Mains supply as source 1 and stand by DG as source 2. It can be used for controlling 2 Generator sets also. When the unit detects a failure of Source 1, it commands the generator to start. Once S2 is available and the output is within limits, the load will be transferred to S2. It performs an open-transition re-transfer when utility power is restored, allowing the engine to cool down before stopping.

### 4) Multicore computing board. – Defense DRDO
**Duration – 6 months**
**Environment/Technology:** Keil IDE. SPI, CAN, I2C, RS485, UART

**Role & Responsibilities:** Firmware developer (BSP), Testing

- Implemented SPI communication between 4 MCU. One acting as a master & other 3 as slaves.
- CAN communication.
- Driver for board bring up
  ADC,UART,EEPROM

**Project Description:**

The control card designed for DRDO PUNE. It is a controller card in **DAKSHA** robot developed by DRDO. Control card having 4 MCU, communicating with each other via various communication protocols such as UART, SPI, CAN. Backbone of communication is SPI.

**5)   OBD Linker (On Board Diagnostics) -- Automotive**
**Duration – 6 months**
**Environment/Technology:** NUC 140, Keil IDE, ISO15765-4, CAN, GSM

**Role & Responsibilities** Driver developer.
- CAN driver development
- OBD protocol implementation
- Bluetooth, GSM,GPS interfacing
- Testing with OBD simulator

**Project Description:**

The product aimed for on board diagnostics of a car. Every car having an OBD port near driver seat. User will use android application having Bluetooth connectivity with OBD linker to communicate with car. User will send different query messages to linker using mobile app & OBD linker will get the respective information from car using CAN protocol. OBD linker will send collected information to user through Bluetooth connectivity. Also all information will be uploaded to web server using GPRS connection in GSM.

**6)   BMS (Battery management system) - Industrial**
**Duration – 6 months**
**Environment/Technology:** KEIL. SPI, GSM, UART

**Role & Responsibilities:** Firmware developer.
- Application code development
- Passive balancing algorithm.
- GSM interfacing.

**Project Description:**

The product aimed for determining Battery health status, according to that charging and discharging of battery packs. The battery monitoring was done by sensing voltages of different packs used to make battery. Battery management was done using passive balancing technique. Battery charging System was done using MPPT technology for charging through Solar panel. Details like battery voltage, charging current, load current, charging stage & other parameters were uploaded to server using GPRS. Load cut off was achieved using details of incoming SMS to BMS.

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**Education:**

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**Bachelor in Electronics & Telecommunication (BE-E&TC)**
University of Pune, India           - 69%                                                          *2010—2013*

**Diploma in Electronics & Telecommunication**
CWIT                                - 83%                                                          *2007—2010*

**S.S.E**
Maharashtra State Board, India. - 87%                                                              *2007*

**Seminars and Workshops Conducted:**

**Embedded System Product development** at Modern education Society's College of Engineering, Pune, India

**Trainer**  *July 2016*

- ☐ Details on Embedded system development flow. Requirement capturing, System Architecting, Hardware development, firmware development, Testing, documentation.
- ☐ Provided comprehensive overview on the features of MCU, developing tools.

**Embedded System firmware development** at Shri Ramchandra College of Engineering, Pune, India

**Trainer**  *Jan 2016*

- ☐ Different interface's using LPC1768 & LPC 2148 Microcontroller.
- ☐ Debugging & code development in Keil uVision.

**Strengths:**

1. Initiative
2. Quick Learner
3. Paying Attention to Detail
4. Excellent working relationships and communication skills

**Declaration:**

I hereby declare that the above particulars are true and correct to the best of my knowledge.

Date:                                                                                          Rahul Appaji Mankumbare

Place: