TUSHAR AHERKAR

Staff Engineer, Product Development Engineer

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WORK EXPERIENCE

Staff Engineer, Product Development Engineer

Sandisk, Bengaluru *(July 2022 - Present)*

- Engineered Component Firmware Architecture platform aimed towards cSSD products.
- **Embedded Systems:** Extensive experience in embedded systems development, with a focus on **ARC HS and ARC EM** processors, including implementing low-level hardware interfaces, and writing applications in multithreaded environment.
- Proficient in debug methodologies which includes **JTAG debugging, Informer Events and Go Logic analyser** to diagnose and resolve firmware issues while developing different firmware modules.
- Engaged in **strategic business travel** to Malaysia to ensure smooth adoption of firmware platform in production environment on a substantial volume of units. Additionally, led knowledge transfer sessions at the **Malaysia** site.
- Successfully obtained **trade secret protection** for a novel idea conceptualised, developed and brought up newly as part of Component Firmware Architecture platform.

Senior Engineer, Product Development Engineer

Sandisk, Bengaluru (July 2019 - July 2022)

- Contributed in **designing, developing, implementing and validating** DLE Firmware for cSSD products.
- Collaborated well with different teams across different geographical locations to understand the production environment and to define and document requirements for seamless deployment at scale.
- Experience implementing and configuring hardware and software **watchdog timers** to ensure system reliability and recovery in embedded systems.
- Promoted to Staff Engineer role based on exceptional performance in DLE firmware development project.

Intern, Product Development Engineer

Sandisk, Bengaluru (Jan 2019 - June 2019)

- Played an integral role in the collaborative development of DLE firmware platform in **C** for BiCS NAND technologies used in flash memory chips.
- Designed and developed Remote Desktop Connection and Log Decoder Utility using **QT C++ framework** as **extracurricular project**.

SKILLS

Languages	*C (Proficient), C++ (Proficient)*
Tools/ Frameworks	*Qt Creator, etc*
RTOS	*MQX, ThreadX RTOS, FreeRTOS*
Processors/MCUs	*ARC HS, ARC EM, Atmel, etc.*
Communication protocols	*I2C, UART, GPIO etc*
Debuggers	*JTAG, Go-logic Analyzer, Oscilloscope, GDB, ATB Trace, MDB Metware Debugger*
Source Version Control	*Git, SVN, BitBucket*
Operating Systems	*Ubuntu, Windows*
Scripts	*Python, Bash scripts, Shell Scripts*
Advanced Data Path	*CAP, CAM, LDPC, Flash Interface Module, LLFS*
Platform Bringup Skills	*Board Bringup, Platform Development*
Others	*IPC - Interprocess Communication, POSIX Thread, DSA, etc*

PROJECTS

Component Firmware Architecture Platform

(Jan. 2024 - Present)

Technologies Used : MQX RTOS, Multithreaded Programming, ARC HS EM Processors, Embedded C, JTAG, Metaware debugger

- Involved in multiple stages of **Design, POC, Implementation and** Validation of CFA firmware.
- Developed firmware involving **multiple cores** in existing DLE platform.
- Key contributor in developing firmware for an embedded system driving cSSD, eSSD, ECB NAND operations in **multithreaded environment** running on ARC HS and ARC EM processors.
- Conceived and implemented a unique solution over CST platform which was approved as a **trade secret** by the organization (FIPID:3130423).
- Designed and implemented **mailbox and queue** systems to manage **inter-process communication**, ensuring efficient data handling and synchronisation.
- Travelled to **Malaysia** to collaborate with product engineering team to ensure smooth adoption of the platform in production environment.
- Utilised **Go logic analyser** to capture, decode, and analyze command sequences on the NAND bus, enabling precise debugging and performance improvements.
- Projected to reduce the test time of NAND by 50% with the help of novel developed firmware which in turn results in **$15M capex savings.**

HONORS AND REWARDS

2024 Recognized by **Critics' Choice Award** – **Innovation Bazar,** organized for **CFA platform Firmware Idea**

2023 Participated in **Hackathon competition** organised by Western Digital.

2020-2021 Published **2 papers** in Western Digital Internal Forums.

2019-2024 Received multiple **milestone completion awards** for successfully meeting project deadlines and ensuring timely delivery of objectives with quality.

2017 GATE 2017: Secured **All India Rank 2608** among **95000+** students

ACTIVITIES

- **Content Creation** on YouTube (1M+ views) and Instagram (2M+ views)
- **Chess** (Represented in **Maharashtra State Junior U/19,** Chess Championship 2010 and winner of many company and college-level chess events)
- **Table Tennis** (**Winner** of STM Olympics 2020, 2023 organized by Western Digital and many college-level events)
- Managed and organised engaging team-building recreational activities on a monthly basis.

EDUCATION

M. E. Computer Science

BITS Pilani. *(2017 - 2019)*

- **CGPA: 9.07**
- Served as a dedicated **Teaching Assistant with a stipend,** providing instructional support by delivering lectures, guiding lab assignments, and invigilating examinations for undergraduate courses "CS F363 Compiler Construction" and "CS F301 Principles of Programming Language".

B. E. Computer Science

Pune University *(2013 - 2017)*

- Graduated with **first class** in distinction**.**
- Participated in many technical and cultural events.
- **Winner** among 100+ participants at coding event "Code to Hunt Competition" of "INNOVATION 2K17" organized by MKSS's Cummins College of Engineering, Pune.
- Secured **first position** competing amongst 60+ participants at coding event "ALGORHYTHM 2K16" organized by PVG's COET, Pune

XII th (Percentage : 85%)

Maharashtra Board *(2012- 2013)*

X th (Percentage : 99.27%)

Maharashtra Board *(2010 - 2011)*

PROJECTS

Download and Executable (DLE) Firmware Development for cSSD Products

(Jan. 2021 - Dec 2023)

Technologies Used : MQX RTOS, Multithreaded Programming, ARC HS EM Processors, Embedded C, JTAG, Metaware debugger

- Designed and developed DLE firmware to enable **concurrent data write and reads** performing on NAND.
- Redesigned the queues to drive Flash Interface Module optimising the performance so that user can populate the NAND commands in ping pong fashion.
- Revamped the **processor system clocks** to speed up the performance of controller to meet system expectations.
- Developed low-level driver features for hardware peripherals such as **UART, I2C, GPIO** etc
- Implemented and configured **watchdog timers WDTs** for automatic reset during system hang or unresponsive states.
- Hands-on experience configuring and handling hardware **interrupts (IRQs)**, including prioritization and masking. Also implemented their corresponding **ISRs** for real time response.
- Leveraged the proposed design of using ping pong queues across different cSSD, RPG, uSD products to obtain optimum performance.

Remote Desktop Connection and Log Decoder Utility Tool

(Jan. 2019 - June 2019)

Technologies Used : C++, Qt Framework, QSql

- Developed Remote Desktop Connection Tool as extra curricular project to enable remote access and control of lab systems.
- Designed and implemented a **database listing feature** using **QSql** for efficient management and retrieval of connection records within **sqlite database**.
- Implemented an intuitive user interface with the **QT framework** to enhance user experience and usability.
- Created a log decoder to parse and analyze logs generated from multiple firmware platforms focussing CST as well as other firmware platforms across cross-functional team.
- Reduced troubleshooting time through the integration of multiple test firmware platform log decoder functionality in single tool.
- Received **positive feedback** from users for the tool's intuitive design and reliability which allowed **cross-functional teams** (**Shanghai, Malaysia and India**) to use the same for their day-to-day activities which involved remote desktop connection to the Lab PCs.