

Tejaswi Reddy

Embedded Developer

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PROFESSIONAL SUMMARY

Embedded Systems Engineer with 5+ years of experience, specializing in networking and automotive domains. Skilled in test case execution, bug tracking, reporting, test planning, and test case design. Proficient in developing C code and experienced in version control. Strong expertise in communication protocols (UART, SPI, I2C, CAN, CDL, J1939) and hardware platforms (STM32F103VC, STM32F207VC, STM32F427). ISO-certified with hands-on experience in ORCAD designing, Linux, FreeRTOS, and debugging tools like Wireshark. Adept at automation, hardware testing, and application-level protocol development, bringing a detail-oriented approach to embedded system design and validation. Seeking opportunities to leverage my skills in a challenging role within the embedded systems industry.

SKILLS

Programming Languages - C Programming, Embedded Software Programming, RTOS, Microcontrollers

Software Tools - Keil uV4, Keil uV5

Networking Protocols - X modem, TCP/IP, ARP, ICMP, HTTP, SNMP, SNTP, DHCP, TFTP, TELNET, Protocol Stacks

Communication Protocols - UART, SPI, I2C, CAN, CDL, J1939

Debugging Tools - Wireshark, ATP Testing, ET, Trace32, CANalyzer

Soft Skills - Code Review, Root Cause Analysis, Written and Verbal Communication

WORK EXPERIENCE

07.2022 - Present **Embedded Software Developer**

Automotive Robotics India Pvt Ltd, Hyderabad

Roles and Responsibilities :

- Conducted **Regression Testing** to ensure system stability and verify protocol implementation.
- Performed comprehensive testing on **dual ECM (Engine Control Module) and single ECM cases**, validating CDL communication accuracy.
- Analyzed and validated data exchange between ECMs, ensuring **seamless communication with and without multiple ECM connections**.
- Designed and executed **test cases for CDL protocol**, evaluating system performance and message integrity.
- Utilized **Canalyzer and Trace 32** for protocol analysis, debugging, and performance optimization.
- Developed and tested **CDL message structures**, including **Address Segments, Data Segments, and Checksum validation** for reliable communication.
- Collaborated with cross-functional teams to enhance CDL protocol efficiency and resolve system-level issues.
- Managed version control and documentation using **Git**, ensuring streamlined development and testing workflows.

07.2018 - 07.2022 Embedded Developer

Team Engineers Advance Technologies Pvt Ltd, Hyderabad

- **Embedded Protocol Development & Integration:** Ported and integrated TCP/IP stack, ARP, IP, ICMP, UDP, DHCP, SNMP, TELNET, HTTP, and TFTP protocols across multiple embedded platforms, including STM32F103VC, STM32F207VC, and Nucleo F429ZI.
- **Networking & Communication Systems:** Designed and implemented Ethernet-to-serial converters (RS232, RS485, RS422 to Ethernet/IP) and Ethernet-to-E1 (G.703) converters, ensuring seamless data transmission over private and public networks.
- **Real-Time System Development:** Developed and implemented event logging systems, real-time clock (RTC) features, and menu-based serial user interfaces for remote device configuration.
- **Bootloader & Device Management:** Designed and implemented X-Modem protocol-based bootloaders to enable firmware updates and device management.
- **Hardware & Software Testing:** Performed extensive end-to-end testing, regression testing, and protocol validation using Wireshark, KEIL uVision 5, and CubeMX to ensure system stability and performance.
- **Industrial & Automotive Applications:** Contributed to the development of railway signaling equipment (ITU-T V.21/V.23 standards), industrial communication devices, and power distribution units (PDU) with remote SNMP-based monitoring capabilities.
- **Cross-functional Collaboration:** Engaged in design discussions, project engineering activities, and debugging sessions, collaborating with hardware and software teams to enhance product reliability.
- This role strengthened my expertise in **embedded networking, protocol development, hardware integration, and system debugging**, contributing to telecom, industrial automation, and automotive applications.

ACADEMIC PROFILE

06.2007 - 04.2011 B. Tech in Electronics Communication Engineering

Nishitha College Of Engineering and technology, Hyderabad

Results: (GPA: 75%)

- Completed a **Project Work/Training** at Electronics Corporation of India Limited (ECIL) in the **Antenna Products and SATCOM Division**.
- Applied theoretical concepts to real-world industrial applications, enhancing practical engineering skills.
- Successfully fulfilled academic curriculum requirements with **satisfactory performance**.

06.2005 - 03.2007 Intermediate

Narayana Junior College, Dilsuknagar, Hyderabad

Results: (GPA: 92%)

- Successfully completed **Higher Secondary Education** with a strong foundation in **Mathematics, Physics, and Chemistry (MPC)**.
- Developed analytical, problem-solving, and logical reasoning skills essential for **engineering and technical domains**.
- Gained a solid understanding of **calculus, electromagnetism, and applied physics**, forming the basis for further studies in **electronics and embedded systems**.

06.2004 - 03.2005 Secondary School Education

Brilliant Grammar High School, Dilsuknagar, Hyderabad

Results: (GPA: 86%)

- Successfully completed **SSC education**, building a strong foundation in **Mathematics, Science, and Technology**.
- Developed problem-solving, logical reasoning, and analytical skills essential for advanced technical education.

PROJECTS

CDL

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- Developed and implemented the **CAT Data Link (CDL) protocol**, a structured communication mechanism for seamless data exchange between networked devices. Ensured reliable message transmission by designing CDL messages with **Address Segments, Data Segments, and Checksum validation** for data integrity.

Key Contributions:

- Designed and optimized the Data Segment to support multiple Parameter Frames for efficient data handling.
- Engineered Parameter Frames to encapsulate crucial data elements, including Parameter Identifier, Data Length Identifier, and Parameter Data.
- Enhanced communication reliability by implementing error detection mechanisms and ensuring structured data flow.
- Integrated CDL within embedded networking systems, improving data transfer efficiency and system interoperability.
- This project strengthened expertise in communication protocols, embedded networking, and real-time data processing, aligning with industry standards for automotive and networking applications.

SHDSL Bis Modem

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- The **SHDSL Bis Modem** project focused on developing a **high-speed data communication modem** for reliable **bidirectional data transmission** over long copper telephone lines. The modem ensures **secure and efficient data exchange**, supporting **networking protocols** for remote device access and management.
- **High-Speed Data Transmission:** Enabled **symmetric digital transmission** over **copper telephone lines** to ensure stable, long-distance communication.
- **Protocol Integration:** Ported and integrated **DHCP, SNTP, and TFTP** to enable **dynamic IP addressing, time synchronization, and remote file transfer**.
- **Remote Access & Network Management:** Implemented **TELNET** to facilitate **secure remote login and device configuration**.
- **User Interface Development:** Designed a **menu-driven serial port user interface** for easy device interaction.
- **System Testing & Validation:** Conducted **end-to-end product testing** to ensure **stability, reliability, and compliance with industry standards**.

FABIO-4CX

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- The **FABIO-4CX** project focused on developing a **robust interfacing solution** for **Indian Railway Signaling Applications**, enabling seamless **V.21/V.23 connectivity** with **E1 or Optical 1+1 channels**. This system ensures **reliable data transmission** for railway axle counter interconnections, with an **auto-changeover mechanism** that redirects traffic to standby copper circuits in case of an **E1 or Optical link failure**. Additionally, the system includes **critical event logging** for real-time fault detection and rapid resolution.
- **Railway Signaling Integration:** Designed to facilitate **real-time data exchange** between railway infrastructure using **ITU-T (International Telecommunication Union) V.21/V.23 protocols**.
- **Auto Changeover Mechanism:** Implemented a **failover system** that automatically switches to standby copper circuits when **E1 or Optical link fails**, ensuring uninterrupted communication.
- **Network Monitoring & Logging:** Developed **event log functionality** for **Ethernet up/down status tracking and Optical link performance monitoring**.
- **Remote Device Management:** Integrated **TELNET** protocol to enable **secure remote access and configuration**.
- **User-Friendly Web Interface:** Developed **HTTP-based customer login webpages** for network monitoring and configuration.
- **Hardware & Sensor Development:** Engineered **sensor models (Analog, Resistive)** for **real-time data acquisition and processing**.
- **System Validation & Testing:** Performed **end-to-end product testing** to ensure compliance with **railway signaling standards and network reliability**.

RS232 To Ethernet Converter

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- The RS232 to Ethernet Converter is a compact electronic device designed to facilitate seamless communication between serial interfaces and Ethernet networks. It converts Ethernet IP/TCP packets into RS232, RS485, or RS422 serial data signals and vice versa. Additionally, the RS232 to E1 (G.703) interface functionality enables the conversion of RS232 asynchronous data into a 2.048 Mbps E1 stream, ensuring compatibility with legacy telecommunication infrastructure. This solution is widely used in industrial automation, networking, and telecommunications applications, enabling reliable and high-speed data transfer.
- **Ported and integrated the W6100 Hardwired Dual TCP/IP Stack Controller** to enhance communication efficiency between serial and Ethernet interfaces.
- **Developed and implemented** software flow control mechanisms using XON/XOFF, ensuring optimal data transmission management.
- **Designed and implemented** an interactive **user interface on the serial port**, providing configuration and monitoring functionalities.
- **Conducted comprehensive testing** of data flow between server and client boards through the converter to validate seamless communication.
- **Debugged and optimized** the communication protocols to improve latency, stability, and data integrity across networked devices.
- **Collaborated with cross-functional teams** to ensure the converter met performance, reliability, and compliance standards for industrial applications.

NUCLEOF429ZI Development Board

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- **Project Description:**
The NUCLEO-F429ZI Development Board project involved **porting and integrating key networking protocols** to enable seamless communication and device management over Ethernet. The goal was to implement **low-level networking stacks and application-layer protocols**, enhancing device functionality and accessibility.
- **Network Protocol Stack Implementation:** Ported and integrated ARP, IP, ICMP, TCP, and UDP protocols with Nucleo F429ZI for robust communication.
- **Remote Device Access & Management:** Integrated application-layer protocols like TELNET, DHCP, HTTP, SNMP, and TFTP to enable remote login, network configuration, and device monitoring.
- **User Interface Development:** Designed and implemented a **serial port-based user interface** for seamless device interaction and configuration.
- **End Product Testing & Validation:** Conducted **comprehensive testing** to ensure proper protocol functionality and device performance.

4 Port To E1 Converter

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- The **4 Port to E1 Converter** is a high-performance **Ethernet-to-E1 interface converter** designed for **network communication systems**. This project involved interfacing a **4-channel Ethernet port (External Marvell Switch)** with an **STM32 processor**, enabling the conversion of **LAN Ethernet data to E1 (2 Mbps)** and transmitting it to the **Master Card**. The device is widely used in **private-to-public network integration**, particularly in **point-to-point leased line connections**.
- **Seamless Ethernet-to-E1 Data Conversion:** Ensured **efficient data transfer** between Ethernet and E1 networks to support telecommunications and leased line applications.
- **Embedded Network Stack Implementation:** Integrated **TCP/IP stack on STM32** to enable smooth network communication.
- **Remote Device Accessibility:** Implemented **TELNET and HTTP protocols** for remote login and web-based device management.
- **Firmware Upgradability:** Designed and implemented an **Application Bootloader using X-Modem protocol** for efficient firmware updates.
- Developed and integrated **TCP/IP stack on STM32**, ensuring reliable network communication and seamless Ethernet data processing.
- Implemented a **serial port-based user interface (UI) menu** to facilitate configuration and monitoring.
- Developed an **Application Bootloader using the X-Modem protocol**, enabling secure and efficient firmware upgrades.
- Integrated **TELNET protocol** for remote device login and management.
- Designed and developed **HTTP-based web interface** to allow users to **monitor and configure device settings remotely**.
- Conducted **system testing, debugging, and validation** to ensure **functional accuracy, stability, and compliance** with network communication standards.

Power Distribution Unit (PDU)

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- **Project Description:**

The **Power Distribution Unit (PDU)** is an embedded system designed to efficiently **distribute and manage electrical power** across **computers, servers, and networking devices** in a **data center environment**. The system features a **centralized control unit** to monitor and allocate power usage while ensuring reliability and energy efficiency.

- **Relay Status Logging:** Developed a log file mechanism to **track relay status** and **monitor power demands** in real-time.
- **Three-Phase Power Monitoring:** Integrated **three-phase displays** for devices sharing power to ensure balanced distribution.
- **Remote Power Management:** Implemented **SNMP (Simple Network Management Protocol)** for **offsite power control and monitoring**, allowing administrators to adjust power settings remotely.
- Participated in **design discussions, system architecture planning, and project engineering activities** to define PDU functionalities.
- Developed and implemented a **serial port-based user interface (UI) menu** for device configuration and status monitoring.
- Integrated **TELNET protocol** to enable **remote login and system access** for remote troubleshooting and configuration.
- Implemented **SNMP protocol** to provide real-time power management capabilities, allowing users to **monitor and adjust power usage** from remote locations.
- Conducted **functional testing, debugging, and system validation** to ensure optimal performance and compliance with data center requirements.