

Ehsan Shahmohammadi

Embedded, Hardware & Optical Engineer

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Embedded, hardware and optical engineer with 10+ years in electronics and telecom. I lead full-cycle product development: prototyping, multi-layer PCB design with EMC/EMI and thermal compliance, firmware in C/C++ on ESP32 and ARM, optical module integration, and system bring-up. My work spans a 4.25 Gbps SFP+ transceiver, a nationwide DWDM deployment, an SNMP monitoring platform running 2,000+ nodes, and an optical-fibre MRI receive coil. Based in Toronto and open to high-impact engineering teams.

EXPERIENCE

Senior Hardware and Embedded Designer · Teqware

Nov 2025 – Present · Toronto, ON (Remote)

End-to-end hardware ownership across multiple electronic products, from prototype through mass production.

- Cut production costs 30% by building internal manufacturing and lifecycle tooling that also raised assembly throughput.
- Designed 4-layer PCBs and embedded Linux systems for mission-critical 24/7 operation.
- Engineered for regulatory compliance from the first schematic, folding UL (incl. UL94 flammability) and FCC EMC/EMI requirements into early design decisions.
- Coordinated design, validation testing and component sourcing directly with external suppliers and contract manufacturers.

Freelance Hardware and Embedded Systems Engineer · Upwork

Sep 2023 – Present · Toronto, ON (Remote)

Contract hardware and firmware work for clients shipping connected products.

- Boosted system performance over 80% by rewriting firmware on ESP-IDF and FreeRTOS with WebSocket transport.
- Reduced hardware footprint 60% with a compact Altium redesign, with no loss of functionality.
- Built an OTA firmware update system over CANBus for ESP32 modules integrated with a Particle IoT hub.
- Cut RAM usage 15% in memory-constrained embedded systems through firmware refactoring.
- Designed a 6-layer PCB to UL and FCC standards for EMC/EMI and thermal performance.
- Programmed Quectel modules with QuecOpen, implementing LTE, GPS and Wi-Fi communication algorithms.

Senior R&D Engineer · Partoe Aval

2021 – 2023 · Tehran, Iran

Optical systems R&D for telecom infrastructure and fibre sensing.

- Achieved 8× capacity improvement researching optical multiplexing for 5G CPRI fronthaul.
- Cut client optical-infrastructure upgrade costs 60% through a cost-optimization programme.
- Developed a high-speed Fiber Bragg Grating (FBG) sensing system using WDM techniques.

Embedded Systems Engineer · DanialMoj

2013 – 2021 · Tehran, Iran

Embedded and optical hardware for nationwide telecom deployments.

- Led a 5-person team building a modular DWDM system — transponders, mux/demux, power and thermal subsystems.
- Designed an SFP+ optical transceiver module supporting 4.25 Gbps.
- Created a 24/7 SNMP monitoring system managing 2,000+ nodes, cutting memory use 70%.
- Designed and programmed embedded firmware for optical systems deployed nationwide.

Software Developer · Pars Homa Parto

2011 – 2013 · Tehran, Iran

Element Management System software for telecom equipment.

- Designed and maintained EMS software for telecom devices in C#/.NET over SNMP.
- Analyzed system data to guide installations and recommend infrastructure improvements.
- Ran comprehensive software testing to validate equipment performance and long-term reliability.

Embedded System Developer · Iran Telecom Research Center (ITRC)

2009 – 2011 · Tehran, Iran

Control-plane hardware and firmware for CWDM systems.

- Increased backplane data throughput 150% by implementing SSP-based communication between control and service cards in a CWDM system.
- Developed and evaluated a new control card on a Windows CE core board for system stability and communication reliability.

TECHNICAL SKILLS

Optical Systems CWDM / DWDM · Coherent optics · AWG · Pluggable transceivers (SFP/SFP+/XFP) · Passive & active optical components · Optical link design · Optical performance testing

Embedded Platforms ESP32 · ARM (ARM7) · PIC · Embedded Linux · Particle IoT · Quectel (QuecOpen)

PCB Design & Integrity Signal integrity · Power integrity · Impedance-controlled routing · HDI · EMC/EMI compliance · Thermal management · UL / FCC design-for-compliance

Programming & Frameworks C · C++ · C# · Python · JavaScript · FreeRTOS · ESP-IDF · Arduino · .NET

Protocols & Interfaces I2C · SPI · UART · CANBus · USB · Ethernet · Wi-Fi · SNMP · TCP/IP · OTA over LTE & CANBus

Test & Measurement Oscilloscope · Logic analyzer · Spectrum analyzer · OSA · OTDR · Optical power meter · VOA · Light source · Fiber splicer

Tools Altium Designer · MATLAB / Simulink · Git · Jira · SQL / SQLite · MongoDB

SELECTED PROJECTS

- MRI Radio Coil with Optical Transmission**

2024

Replaced coaxial cabling in MRI receive coils with optical fibre, improving SNR and cutting thermal effects. Designed an SDR to digitize and transmit coil signals at 63.875 MHz over fibre.
- Optical Transmitter System with WDM**

2017

Modular WDM optical transmitter carrying multiple services and protocols over a single fibre, with SFP/XFP transceiver cards and an embedded Linux control plane.
- SFP 4.25G Transceiver Design**

2015

4.25 Gbps SFP optical transceiver on a 4-layer Altium design. Prototyped and characterized ROSA/TOSA optics plus the amplification and laser-control ICs.
- Digital Motor Protection Relay**

2013

Three-phase motor protection built on PIC18F67K22 with an ADE7758 metering front end, providing real-time monitoring and fault logging.

EDUCATION

- M.Sc., Mechatronics Engineering**

2013 – 2015

Science and Research Branch, Islamic Azad University (SRBIAU) · Automation and Human-Machine Interface. Tehran, Iran.
- B.Sc., Telecommunication Engineering**

2007 – 2010

Telecommunication Faculty · Data Communication. Tehran, Iran.

AWARDS

- Khwarizmi Award**

2010

Iranian Research Organization for Science & Technology (IROST)