

Nicholas Nunziata

Embedded Systems & Reverse Engineering Specialist

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Summary

Hands-on systems integrator, embedded systems engineer and reverse-engineering specialist with strong expertise in embedded hardware, containerized environments, and home automation. Skilled in PCB diagnostics, microsoldering, data recovery, and custom hardware fabrication. Known for creatively solving complex, undocumented technical challenges and building scalable solutions using a combination of off-the-shelf components and custom-engineered systems.

Experience

NiniNunz, LLC
Owner/Operator

2022-Present

Founded and operate a multidisciplinary electronic repair and custom fabrication business spanning consumer electronics, enterprise hardware, automotive systems, industrial equipment, and embedded technologies. Specialize in diagnostics, reverse engineering, board-level repairs, and custom hardware development.

Projects

Junkyard Intelligence Platform
VIN Decoder & Inventory Tracker and Analysis

Oct 2024 - Present

Designed and deployed a full-stack platform that reverse-engineers junkyard APIs to aggregate and update vehicle inventory across hundreds of yards. Built a backend service to decode BMW VINs, enabling part-specific searches down to rare options like soft-close doors, filterable without physically checking each vehicle. Added frontend tools to pinpoint and map exact vehicle locations on the yard, track inventory lifespan and part demand trends, and identify retrofit-compatible modules based on production month granularity. Optimized for high-efficiency yard navigation and precision sourcing for rare OEM components.

CAS3 System Integration
Full Vehicle Network Adaptation

Dec 2024 - Mar 2025

Developed and executed a complete CAS3 retrofit solution for the BMW E83 platform, achieving full cross-domain communication between legacy DCAN and modern KCAN architectures. Engineered custom firmware modifications to enable immobilizer synchronization with a non-native ECU, ensuring stable and secure operation. Integrated multi-source donor modules through bespoke bus bridging techniques, replacing the mechanical ignition barrel with a fully electronic relay system. Deployed diversity antenna arrays and passive proximity sensors to deliver OEM Keyless Entry, Keyless Go, and push-button start functionality, maintaining full compliance with native security and comfort systems.

Modular CoreXY 3D Printer Platform
Custom Additive Manufacturing System for Precision, Speed, and Serviceability

Nov 2021 - April 2022

Engineered and built a highly modular, large-format 3D printer from the ground up, leveraging CAD for custom part design and precision assembly. Sourced mechanical and electronic components from dozens of vendors and integrated off-the-shelf, open-source, and custom-engineered hardware into a unified, serviceable platform. Modified an ATX power supply for system reliability and implemented advanced features such as auto bed leveling, filament runout detection, and power loss recovery. Utilized RepRap firmware to enable robust hardware integration and advanced machine control. Precision engineering throughout the build enables both high-speed printing and extremely detailed output, with tight tolerances achieved through iterative prototyping and validation. Developed a modular architecture for easy subsystem upgrades and integrated a camera-based print failure detection system for remote diagnostics, demonstrating full-cycle experience in hardware integration, controls, and embedded systems.

Skills

Reverse Engineering



Hardware Reverse Engineering, Board-Level Repair, Low-Level Systems Analysis, Microsoldering

Full Stack Web Development

JavaScript, HTML, CSS, Python, Node.js, SQL, Express.js, RESTful, Angular, TypeScript

Mechatronics

Mechanical Design, CAD, RepRap, MCU, IoT, FDM, DC Power Systems, Stepper Drivers, Electrical Design, AutoDesk

Containerization & Virtualization

Docker, Portainer, VMware, Grafana, CI/CD, RTOS, QEMU, Unifi, Tailscale, WireGuard, Proxmox

Smart Home Development

Home Assistant, HomeKit, Tuya API, SmartThings API, Resideo API, MQTT, Nest API, ESPHome, Tasmota

Automotive Systems

CAN Bus, VVDI, ADAS, FlexRay, LIN, MOST, WinKFP, NCS, EEPROM, RF, Immobilizers