

# CHARLES W. FLORESTAL

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## PROFESSIONAL SUMMARY

Embedded Systems Engineer with dual bachelor's degrees in Electrical Engineering and Computer Engineering and professional experience developing embedded hardware, firmware, and PC-based control systems. Experienced with microcontrollers, PCB design, embedded C/C++ , hardware/software integration, serial communications, IoT systems, and rapid prototyping. Hands-on engineer with experience taking systems from design and development through testing and troubleshooting.

## CORE COMPETENCIES

Embedded Systems • Firmware Development • Embedded C/C++ • Hardware/Firmware Integration • PCB Design • Circuit Design • Microcontrollers • Communication Protocols • Hardware Debugging • Rapid Prototyping

## PROFESSIONAL EXPERIENCE

### **Florestal Enterprises LLC - Electronic / Embedded Systems Engineer**

Contract Engineering Services | 2022 - Present

#### **Client: Alchemy Escape Room - Contract Electronic Engineer (2026)**

- Designed and developed embedded systems using ESP32/ESP32-S3.
- Developed firmware communication with multiple RFID readers over UART.
- Implemented MQTT-based communication for connected devices.
- Designed, integrated, tested, and debugged electronic hardware and embedded systems.
- Troubleshoot real-world RF, communication, hardware, and firmware issues.

#### **Client: SMTC Corporation - Contract Embedded Systems Engineer (2022)**

- Developed Arduino-based firmware for a data acquisition system.
- Implemented UART/USB communication between the data acquisition device and external apparatus.
- Developed Windows control software in C# to operate the apparatus.
- Developed software for retrieving, processing, and manipulating acquired data.
- Integrated embedded firmware, PC software, and external test equipment into a complete system.

## INDEPENDENT ENGINEERING PROJECTS

### **Point of Sale Card Readers Charging Station**

Embedded Hardware / PCB Design - Completed

- Designed a custom charging and power-management PCB for multiple payment card readers.
- Implemented regulated power distribution, current monitoring, and protection circuitry.

- Designed schematic, PCB layout, 3D housing, BOM, and manufacturing documentation.

## **7-Segment Display Panel**

Embedded Systems / PCB / RF - In Development

- Designed a custom 4-layer PCB, integrating an STM32 MCU and GN1629A LED display driver chip.
- Developed embedded drivers and firmware for display control.
- Designed and integrated a 433 MHz wireless control system and custom LED strips.

## **High Voltage Arc Generation**

Power Electronics / Embedded Hardware / PCB Design - In Development

- Designed a custom PCB, utilizing 555 timer IC for PWM generation and drive of transformer circuit.
- Engineered the system for a compact, portable form factor with an emphasis on commercial-style product integration.
- Designed schematics, PCB layout, 3D housing, BOM and manufacturing documentation.

## **Temperature Sensor**

Embedded Systems / PCB / CAD - In Development

- Designed a custom PCB, integrating an ATMEGA328P MCU and ADC peripheral for readings from designated temperature sensor.
- Developed embedded drivers/firmware for temperature acquisition, conversions, and display.
- Designed schematics, PCB layout, 3D housing, BOM and manufacturing documentation.

## **TECHNICAL SKILLS**

### **Programming & Software**

Embedded C/C++ • C# • Python • Java • JavaScript/Typescript • SQL

### **Microcontrollers & Embedded Platforms**

STM32 • AVR • ESP32/ESP32-S3 • Arduino • Raspberry Pi • PIC

### **Hardware & PCB Design**

PCB Design • Circuit Design • KiCad • EasyEDA • Fusion360 • Eagle • Circuit Maker

### **Development Tools**

Git/Github • CMake • GCC-Toolchains • Visual Studio • STM32CubeIDE • Microchip Studio • Code Composer Studio

### **Interfaces & Protocols**

USB • UART • SPI • I2C • CAN • MQTT • RF/433MHz

## **EDUCATION**

### **Florida Atlantic University. Boca Raton, FL**

- B.S. Computer Engineering - August 2017
- B.S. Electrical Engineering - December 2019