Embedded Expert IO

EmbeddedExpertIO™

CERTIFICATE OF GRADUATION

Awarded To

CARLOS DELFINO CARVALHO PINHEIRO

Graduating From

Modern Bare-Metal Embedded C++ Programming from Ground Up™

Date: 2026-01-30

Serial No.

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Curriculum - Modern Bare-Metal Embedded C++ Programming from Ground Up

• Introduction to Bare-Metal Programming	• UART driver implementation
• ARM Cortex-M architecture fundamentals	• SPI communication
• Toolchain setup and environment	• I2C driver development
• Understanding datasheets and manuals	• PWM generation
• Register-level programming	• OOP in Embedded C++
• Memory-mapped I/O	• Classes and encapsulation
• GPIO driver development	• Templates in embedded systems
• Clock configuration	• Code optimization techniques
• Interrupt handling (NVIC)	• Memory management
• Timers programming	• Reusable driver libraries
• ADC driver development	• Firmware architecture design