

ARM-7 LPC2148

(Register-level Programming)

DESCRIPTION:

With a programming-based approach, this course is designed to give you a basic foundation in bare-metal firmware development for ARM-based microcontrollers. The goal of this course is to teach you how to navigate the microcontroller reference manual and datasheet to extract the correct information to build peripheral drivers and firmware professionally. To achieve this goal, no libraries are used in this course, purely bare-metal embedded-c and register manipulations. This version of the Course uses the ARM 7-LPC2148.

WHAT YOU WILL LEARN:

Write firmware using only bare-metal embedded-c

- Learn how to code at the Register level
- Write UART code using bare-metal embedded-c
- Write TIMER code using bare-metal embedded-c
- Write Interrupt code using bare-metal embedded-c
- Build every single line of code from scratch by writing to the microcontroller's memory space directly.
- Use No third-party libraries, HAL, SPL, or header files
- Understand and write every single line of code yourself- no Copy/Paste
- Use the debugger effectively to analyze and resolve any bugs
- Develop proficiency in your embedded development skills and confidently take the next steps
- Define addresses for the different peripherals

Total Modules: 8

Related Tags: Embedded Systems, Register level, Embedded-C, Bare-Metal Programming

Module 1: What is Embedded Systems

Module 2: Introduction to ARM 7

Module 3: Code Development

Module 4: PLL, Timers & Counters

Module 5: Code Development

Module 6: UART Communication

Module 7: Interrupts

Module 8: Using Interrupts

Module - Introduction to ARM 7

- Introduction to STM32f407xx, KEIL IDE Setup
- Applications - STM32f407xx
- Timer Setup and Creating a Precise Delay

Module - UART Communication

- UART: Datasheet Overview, USART,
- UART: Interrupts, UART
- I2C (inter-integrated circuit)
- SPI (Serial peripheral interface)

Module - PLL, Timers & Counters

- ADC (analog to digital converter), ADC multiple channels
- Compare, Capture, PWM
- Smart Street Light
- ADC DMA
- ADC UART DMA
- USART DMA TRANSFER
- USART DMA RECEIVER SYSTEM
- TIMER(SYSTICK)

Module - Interrupts

- Getting into Interrupts
- External Interrupts
- Input Capture
- Frequency Measurement
- FPU & Ultrasonic Sensor
- Distance Measurement
- DAC Registers
- Sine wave using DAC

Module - Code Development

- LORA – Receiver & DHT11 Moisture Sensor
- RELAY- WDT(WATCHDOG TIMER)
- STM32 & ESP32
- IoT Cloud ESP32