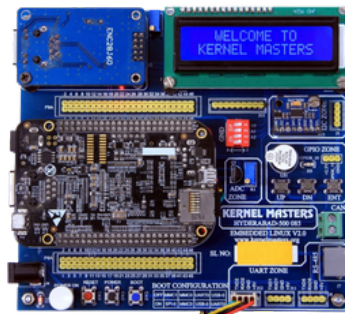
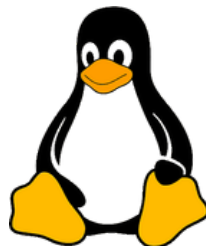


Embedded Linux Device Driver Development

Course Syllabus

A Comprehensive Roadmap from
Essentials to Industry-Ready Expertise



U-Boot

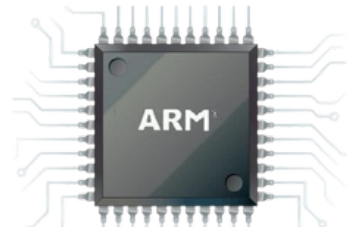


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“

Our Mission & Vision: To empower young Electronics Engineers with the right skills and training to build successful careers in Embedded Systems, while becoming a trusted bridge between talented engineers and the semiconductor industry by delivering quality, industry-ready professionals.

”



Kishore Kumar Boddu
Founder & Director of Kernel Masters

Embedded Linux Device Driver Course Roadmap

Level 1 – Essential Modules (8 Weeks)

Modules 1	Linux Basics & Shell Scripting	— 2 Weeks	
Modules 2	Linux System Programming	— 3 Weeks	Detailed syllabus
Modules 3	Linux Device Drivers	— 3 Weeks	Detailed syllabus

Level 2 – Embedded Linux Project Modules (8 Weeks)

Modules 1	Embedded Linux with Beagle Bone Black	— 2 Weeks	Detailed syllabus
Modules 2	Yocto Project with Beagle Bone Black	— 1 Week	Detailed syllabus
Modules 3	Linux Debugging Techniques & GNU Tool chain	— 1 Week	Detailed syllabus
Modules 4	Linux I2C Drivers	— 1 Week	Detailed syllabus
Modules 5	Embedded Linux Projects	— 2 Weeks	
Modules 6	Placement Assistance Program	— Till Placement	

Level 3 - Add-On Modules (8 Weeks)

Modules 1	Linux Network & SPI Drivers	— 2 Weeks	
Modules 2	Embedded Android	— 2 Weeks	
Modules 3	Wi-Fi Driver / Firmware	— 2 Weeks	
Modules 4	Industrial IoT Gateway	— 2 Weeks	

Embedded Linux Device Driver Course Overview

Level 1 – Essentials

This level is for beginners who want to start a career in Embedded Linux Device Drivers. You will learn Linux basics, shell scripting, system programming, and driver concepts with hands-on examples.

Eligibility: Basic knowledge of C Programming and Data Structures

01

Level 2 – Embedded Linux Projects

This level focuses on hands-on practice in Embedded Linux device driver development. It helps learners improve their coding, implementation, and real-time project skills.

Eligibility: Successful completion of Level 1

02

Level 3 – Add-on

This level helps you specialize in a specific area of Embedded Linux. It builds deeper skills with practical, industry-focused learning.

Eligibility: Successful completion of Level 2

03

Level 1 [Essentials]

This is essential level for those who want to move to **Embedded Linux Device Driver development** area.

What You Will Learn in Level 1

- ✓ Strong foundation in Embedded Linux Device Driver Development
- ✓ Linux basics and shell programming fundamentals
- ✓ System programming and device driver concepts
- ✓ Simple learning with practical real-time examples
- ✓ Preparation for Level 2: driver development and customization

Linux System Programming (LSP)

Build strong fundamentals in Linux System Programming with hands-on experience in real-world applications.

Core Skill Set

- ✓ File, Process, and Memory Management
- ✓ Inter-Process Communication (IPC)
- ✓ Synchronization Mechanisms
- ✓ Socket Programming
- ✓ Multithreading

Practical Industry Examples

- ✓ Device Driver Test Cases
- ✓ Working with
 - evtest
 - fbtest
 - rtc test
 - i2cdev
 - spidev

Linux Device Drivers (LDD)

Master Linux Device Driver development with real-world kernel subsystems and hands-on implementation.

Core Skill Set

- ✓ Linux Kernel Module Programming
- ✓ Interrupt Handling in Linux
- ✓ Kernel Threads and Kernel Timers
- ✓ Character, Block, and Network
- ✓ Device Drivers
- ✓ Multiple Device Driver Development

Practical Industry Examples

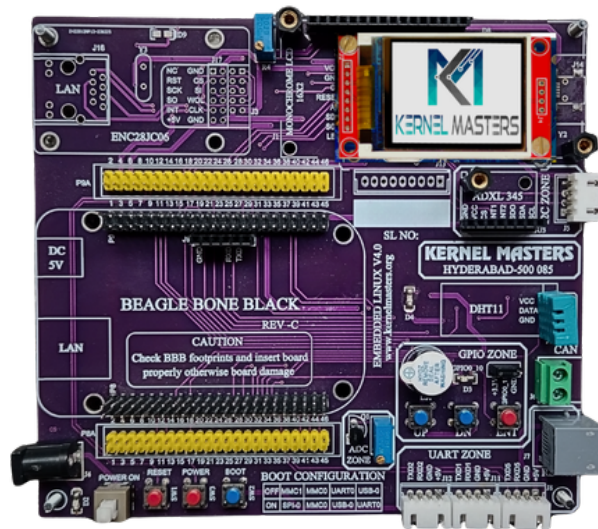
- ✓ Understanding existing Linux kernel subsystems
- ✓ Working with Input
ALSA
V4L2
Network
Camera
IoT & Display subsystems

Level 2

[Embedded Linux Projects]

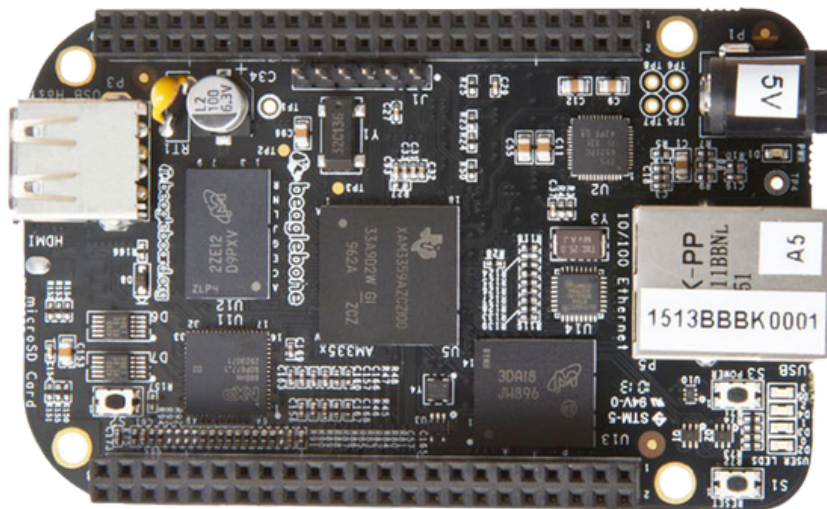
Gain 10x times real-time hands-on experience on **Embedded Linux Device Driver Development.**

Kernel Masters Beagle Bone Black [KM-BBB] Expansion Board



- ✓ Embedded Linux Development Board
- ✓ Board Specifications
- ✓ Serial Comm Protocols: UART, I2C, RS485, CAN, SPI & USB
- ✓ ADC Controller
- ✓ 16X2 Monochrome LCD display
- ✓ Wireless Protocols: Zigbee, BLE, WiFi
- ✓ RTC, EEPROM
- ✓ 128 GPIO Pins
- ✓ Buzzer
- ✓ LED's
- ✓ Potentiometer

Beagle Bone Black



- ✔ Sitara AM3358BZCZ100 ARM Cortex-A8 32-Bit RISC microprocessor, up to 1GHz
- ✔ More and faster memory now with 512MB DDR3L 400MHz SDRAM, 4GB eMMC Memory
- ✔ Onboard storage frees up the microSD card slot for greater expansion
- ✔ Support for existing Cape plug-in boards
- ✔ TPS65217C PMIC regulator and one additional LDO
- ✔ Debug support: Optional onboard 20-pin CTI JTAG
- ✔ HS USB 2.0 Client and Host ports



What You Will Learn in Level 2

- ✓ Hands-on project experience in Embedded Linux Device Driver Development
- ✓ Device integration, porting, and boot process understanding
- ✓ Bootloader customization and boot-time optimization
- ✓ System-level learning with practical kernel exposure
- ✓ Strong industry-relevant real-time development experience



Embedded Linux Porting & BSP

Build, customize, and optimize Linux for real hardware platforms

Core Skill Set

- ✓ Linux Porting on target board
- ✓ Embedded Linux Boot sequence
- ✓ Boot loader
- ✓ ROM Code
- ✓ Device tree source
- ✓ Linux platform/Bus/low Drivers

Practical Industry Examples

- ✓ Embedded Linux Build systems:
- ✓ Create own build system
- ✓ Build Root
- ✓ Yocto Project.



Yocto project on Beagle bone Black

Build custom Embedded Linux images using Yocto on Beagle Bone Black

Core Skill Set

- ✓ Yocto project build environment
- ✓ Customize yocto project as per board requirements.

Practical Industry Examples

- ✓ Embedded Linux Build systems
- ✓ Yocto Project porting on Beagle Bone Black Hardware



Linux I2C Drivers

Develop and interface I2C drivers for real embedded devices

Core Skill Set

- ✓ I2C Communication Protocol format
- ✓ I2C Framework in U-boot & kernel Space
- ✓ I2C User space drivers
- ✓ Linux I2C Adapter and Client Drivers

Practical Industry Examples

- ✓ Add I2C Slave Devices in Kernel Space.
- ✓ RTC [DS1307]
- ✓ EEPROM [AT24C02]
- ✓ Accelerometer Sensor [ADXL345]



Debugging Techniques

Identify, analyze, and fix issues in Embedded Linux systems

Core Skill Set

- ✓ GDB
- ✓ KGDB
- ✓ KDB
- ✓ strace
- ✓ valgrind
- ✓ Kprobe
- ✓ jprobe
- ✓ kexec
- ✓ crash tools

Practical Industry Examples

- ✓ Kernel panic
- ✓ Kernel crash dump
- ✓ Device driver
- ✓ Kernel debugging
- ✓ Application
- ✓ System program debugging



Embedded Linux Real Time Projects

Build real-world Embedded Linux projects with hands-on implementation

Core Skill Set

- ✓ Add a new GPIO/UART/I2C/SPI devices
- ✓ UART, I2C
- ✓ SPI protocol formats
- ✓ Linux I2C
- ✓ SPI framework

Practical Industry Examples

- ✓ Add a project in your profile.
- ✓ Example: Data Logger, Weather monitoring system
- ✓ IoT Gateway
- ✓ Handson Terminal
- ✓ Point of Sale
- ✓ Wi-Fi Router
- ✓ Setup etc...

About Us



Kernel Masters, established in November 2012, has **completed 14 years** of dedicated service in embedded systems training. We have **trained 15,000+** students across **55 batches** and supported **16,000+ learners** in building careers in the embedded industry.

Our programs are designed for both **freshers** and experienced **professionals**, with nearly 30% of our learners coming from **Embedded Systems** or related domains to **upskill and advance their careers**. Our students are now working in reputed companies such as **Qualcomm, Sasken, Collabera, GlobalEdge, Miraфра, SmartPlay, AmericanMegatrends, Visiontek, Qolsys, and Elear Solutions**, reflecting the strong industry relevance of our training in Device Drivers and Embedded Linux.



Our Contact Details
+91 9949062828



More Information
www.kernelmasters.com



Our Email Address
info@kernelmasters.com

Recognition of Excellence



Kernel Masters is proud to have been recognized as **"Embedded Training Institute of the Year"** for both **2022–2023** and **2023–2024** under the Global Education Award category. Receiving this recognition in consecutive years reflects **our consistent commitment to excellence** in embedded training, **practical learning**, and **industry-oriented skill** development.

These awards stand as a testament to our dedication in **shaping skilled embedded professionals** and delivering **quality technical education** that aligns with industry needs. Such achievements inspire us to continue **empowering students** and **professionals** with strong fundamentals, **hands-on experience**, and **career-focused training**.



Our Contact Details
+91 9949062828



More Information
www.kernelmasters.com



Our Email Address
info@kernelmasters.com

Thank You

For your attention

VISIT US



Our Website

www.kernelmasters.com



Contact Number

9949-06-2828



Our Email

info@kernelmasters.com



Address

Madhuri Nilayam building, LIG 420, 2nd Floor, KPHB 7th
Phase Rd, Colony, Hyderabad, Telangana 500085