KERNEL MASTERS

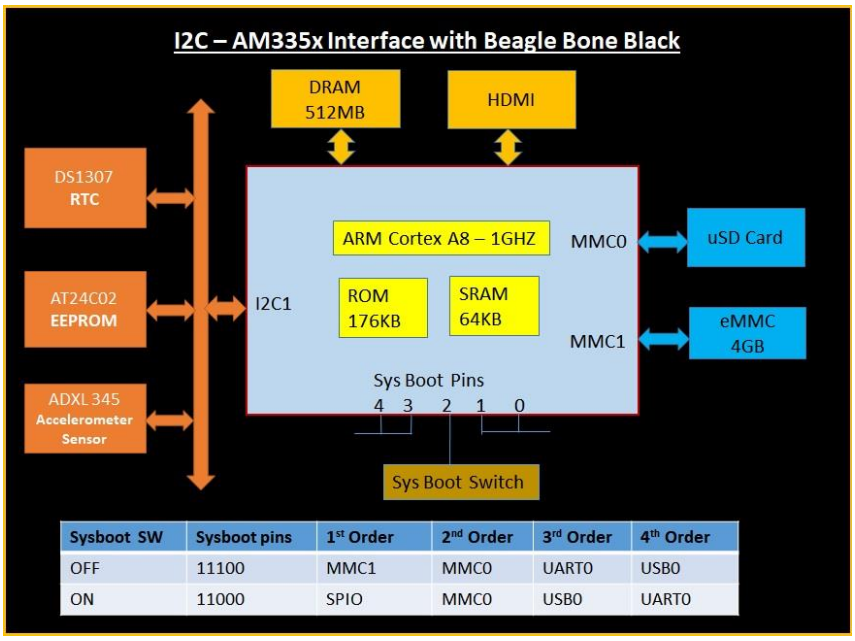
Online/Offline Training on

Linux I2C Drivers

[Master, Slave & User space Drivers]

Add I2C Slave Device with AM3358 Controller

By Kishore Kumar Boddu



Sysboot SW	Sysboot pins	1st Order	2nd Order	3rd Order	4th Order
OFF	11100	MMC1	MMC0	UART0	USB0
ON	11000	SPIO	MMC0	USB0	UART0

All Sessions are highly interactive hands-on-sessions.

Prerequisites:

- Assumption zero knowledge in I2C Communication Protocol.
- We assume that attendees are fully fluent in C, data structures and that the Linux/Unix command line is a familiar environment.
- Linux System Programming & Device Drivers.
- Embedded Linux Porting knowledge.

Hardware used

- The practical exercises will be run on a Beagle Bone Black (BBB) with a Cortex ARM.
- All exercises will be applicable to any other type of board supported by Linux.
- Online practical demonstration for I2C Master, Slave and User space Drivers on BBB. Later on you can buy and practise, support will be provided. Material will be provided with step by step procedure for lab guidance.
- Device Example: RTC, EEPROM & Accelerometer Sensor

Linux I2C Drivers Syllabus Summary: (Detailed agenda next page)

Session 1: I2C High Level Analysis
Session 2: I2C Low Level Analysis
Session 3: Developing I2C Master & Slave Drivers in u-boot Space
Session 4: Developing I2C Master & Slave Drivers in Kernel Space
Session 5: Developing I2C Master & Slave Drivers in User Space
Session 6: Understanding the complete flow

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All Sessions are highly interactive hands-on-sessions with KM-BBB.

Linux I2C Drivers Detailed Syllabus: Master, Slave & User Space Drivers

Session 1: I2C High Level Analysis

- I2C communication protocol basics/terminology
  - I2C Modes
  - I2C Communication Protocol Format
  - Bus arbitration loss
  - Clock Stretch
- AM3358 Controller (master) I2C specifications & Block Diagram
- ADXL345 & DS1307 (Slave) specifications

Session 2: I2C Low Level Analysis

- Understanding I2C Registers for AM3358 Controller.
- Understanding Accelerometer Sensor [ADXl345] & RTC [DS1307] Specifications, comm. Protocol format and register programming model.
- Master Slave interface Block Diagram.

Session 3: Developing I2C Master & Slave Drivers in u-boot Space

U-boot Level

- Add I2C Mux/Pad Configuration in board specific mux file.
- Scan I2C Slave device using I2C command in prompt.
- Test basic communication with slave device using I2C command in u-boot command prompt.

Session 4: Developing I2C Master & Slave Drivers in Kernel Space

Kernel Level

- Add I2C Master/Slave driver platform data in to Device tree source code
- Integrating platform (I2C Master) driver and slave driver with framework.
- Check Probe and initialization functions both Master and slave drivers.
- Registering I2C master/adapter and slave drivers

Session 5: Developing I2C Master & Slave Drivers in User Space

User Level

- Disable I2C Slave driver and test I2C Master Driver with User space driver (i2c-dev) absent of I2C Slave driver.
- Enable I2C Slave driver and test I2C slave driver with device specific applications.

Session 6: Understanding the complete flow

- Understanding I2C Master, slave initialization and device operation source code flow from bottom to top vice versa.
- Understanding I2C Interrupt flow with I2C Debug options.