Embedded Linux Device Drivers

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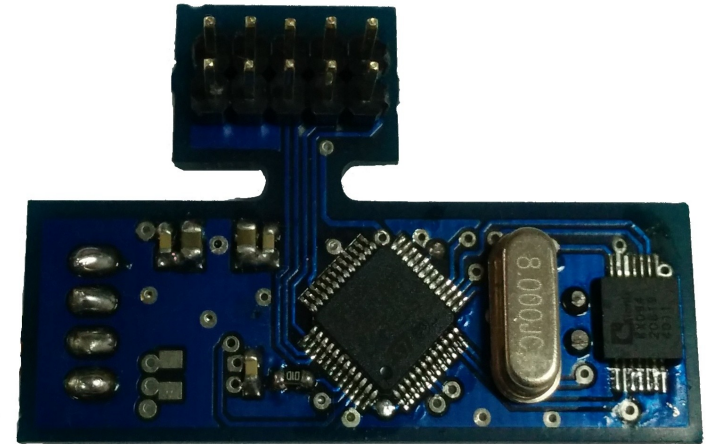September 7th, Novi Sad, Serbia

Agenda

- About Embedded Systems

- Hardware Specifics of Embedded Systems

- Embedded Linux

- Linux Device Driver Architecture

- Workshop

Embedded Systems

- Dedicated function

- Based on microcontrollers

- Optimization

- Variety of applications

Hardware Specifics

- On-Chip peripherials

- Many CPU architectures

- Word length 8 to 32 bit

- Cheap development boards

- SoC

Peripherials

- Serial Communication Interfaces
- Synchronous Serial Communication
- Universal Serial Bus
- Networks
- Fieldbuses
- Timers
- Discrete IO (GPIO)
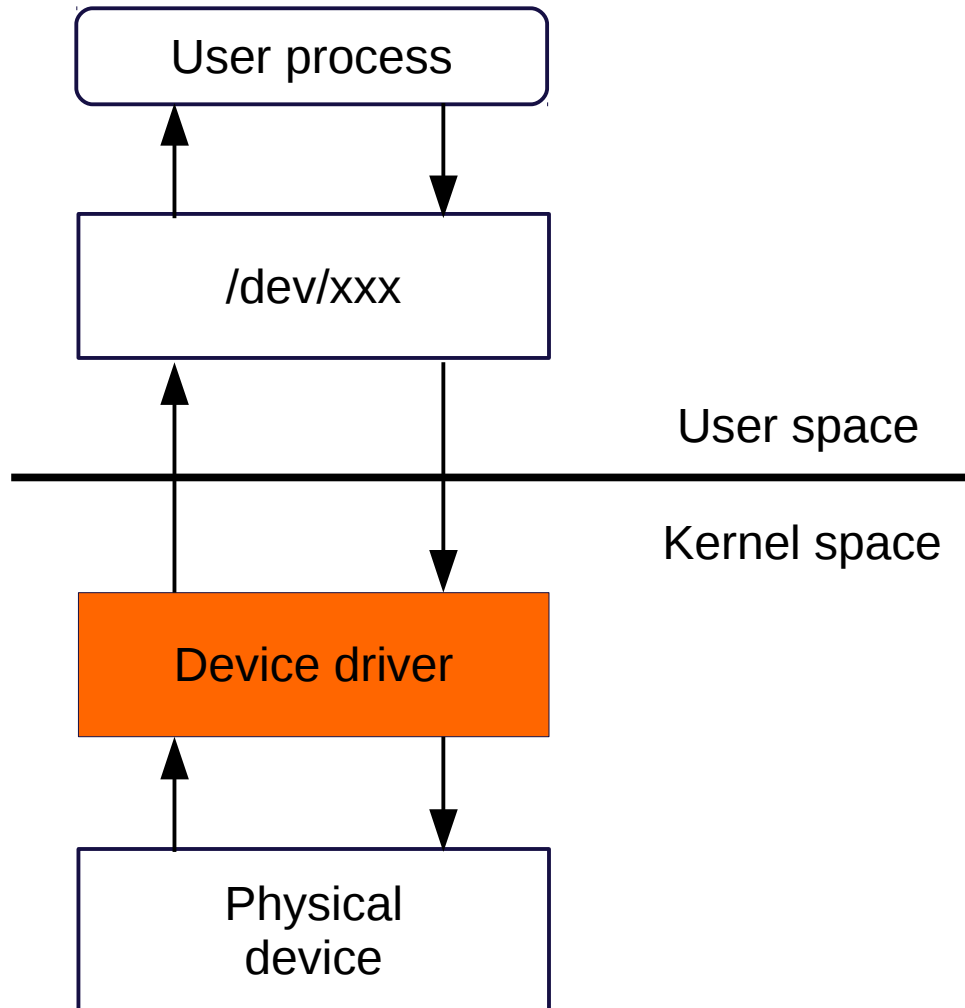- Analog to Digital / Digital to Analog

Embedded Linux

- Purpose-built

- Lightweight and optimized

- Kernel and minimal userspace
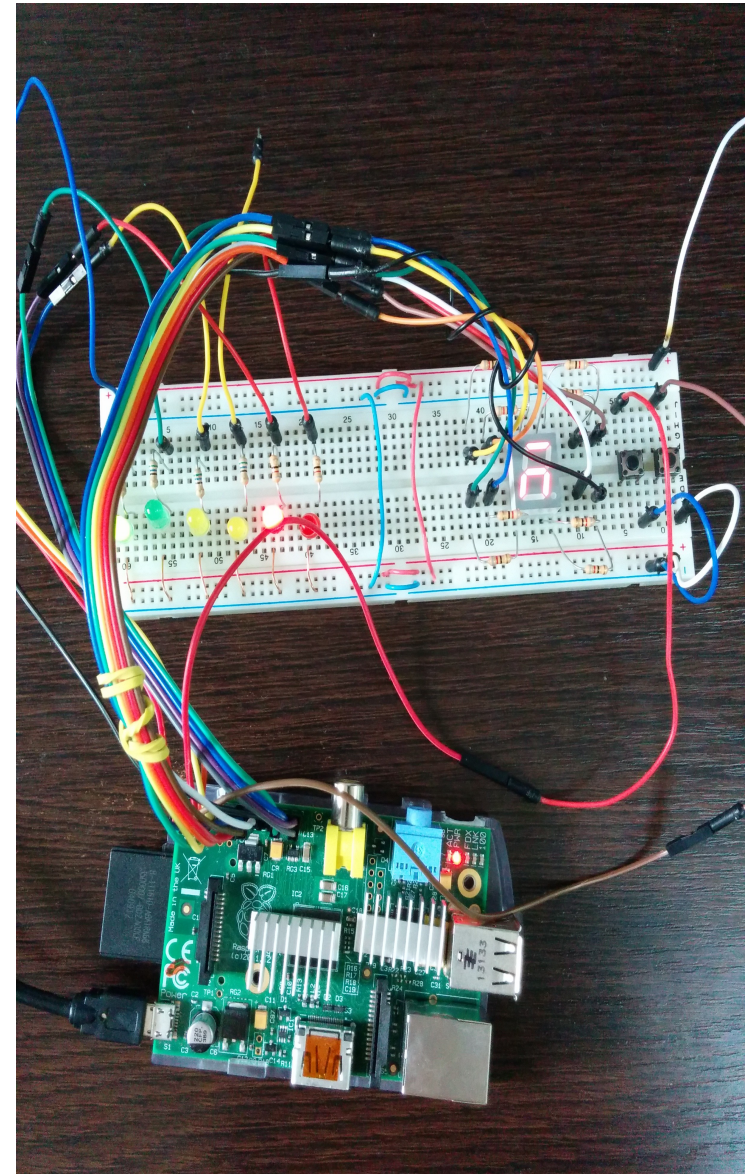
- Buildroot

- Initramfs

Linux Device Drivers

User process

/dev/xxx

User space

Kernel space

Device driver

Physical device
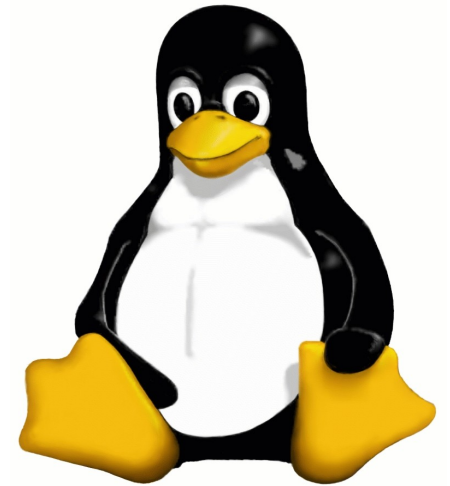
- The Role of the Driver

- Classes of Devices

- Memory mapping

- Interrupt Handling

- Time routines

Workshop

- Raspberry Pi

- Protoboard

  - Some LEDs

  - Push Buttons

  - 7 segment display

- Buildroot (rpi-buildroot)

- Custom Linux Kernel module

Workshop sources

- https://github/ICBTech

- git clone https://github.com/icbtech/rpi-buildroot

- git clone https://github.com/icbtech/BalCCon2k14

Buildroot

- make raspberrypi_defconfig
- make nconfig
- make

- Internet connection required (first build)
- Takes 15 minutes on Core i7 3770

Questions?

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