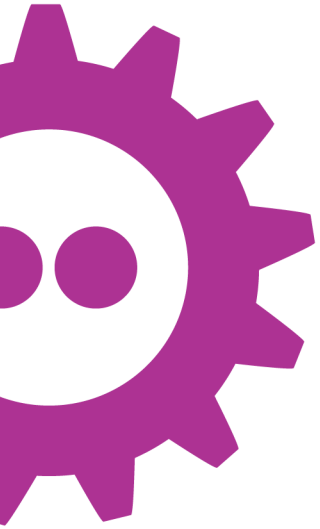

Booting it successfully for the first time in mainline

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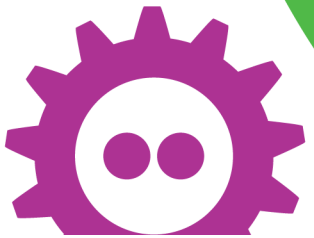

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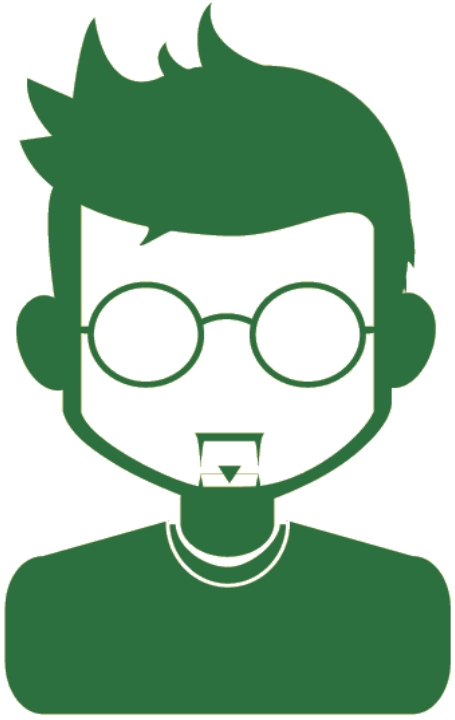
Enric Balletbo i Serra

Electronic Engineer

- Hardware and Linux enthusiast
- Kernel contributor
- More than 5 years of experience bringing-up different kind of boards.



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Agenda

- What is Board Bring-Up?
- Process of the development of a new board.
- What’s wrong with this process.
- How mainline can help us to improve this process.
- Lessons learned.

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What is Board Bring-Up?

> ***Board bring-up is the process of validating, both electrically and functionally, a new circuit board design including the porting of boot firmware and the development of a Board Support Package.***

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Hardware

- Component selection
- Circuit Design (Schematic)
- Bill of Materials (BOM)
- PCB prototypes
- Certification

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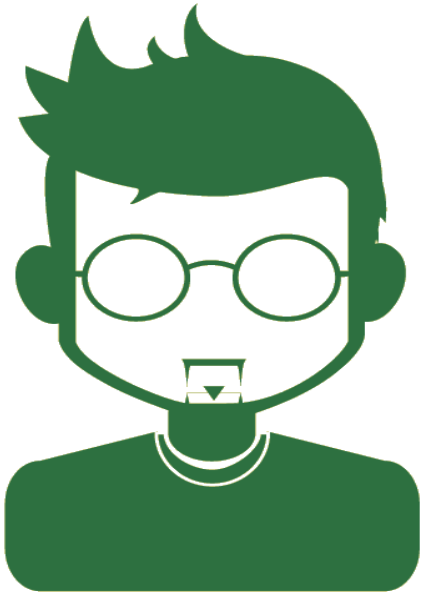

Software

- Firmware programming
- Bootloader
- Kernel and device drivers
- Software stack
- Application development

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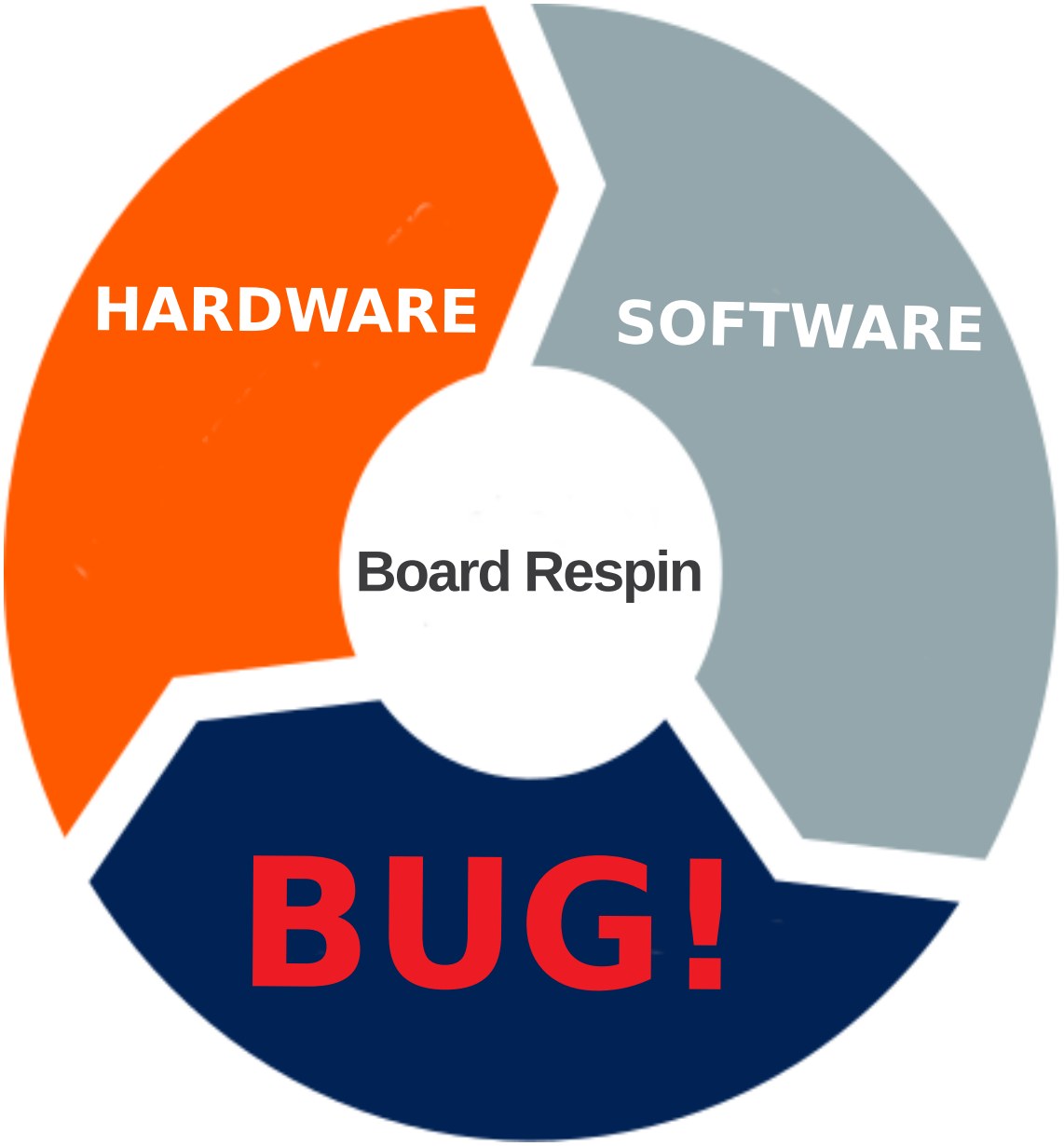
What's the problem?



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Has this ever happened to you?

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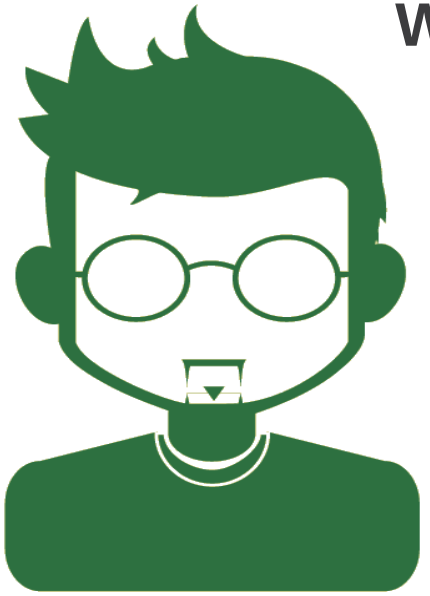
And how we can do this?

Work together!



Software

Hardware

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How mainline can help us to improve the process?

Components selection
&
Circuit Design (Schematic)

Component selection

- Main processor
  - Evaluate the Board Support Package
  - Consider if it’s well supported in mainline
- Other IC, sensors, displays, real time clocks ...
  - Check that the driver is upstream.
- Do NOT abuse of use of microcontrollers.
  - Can an IC replace the microcontroller?

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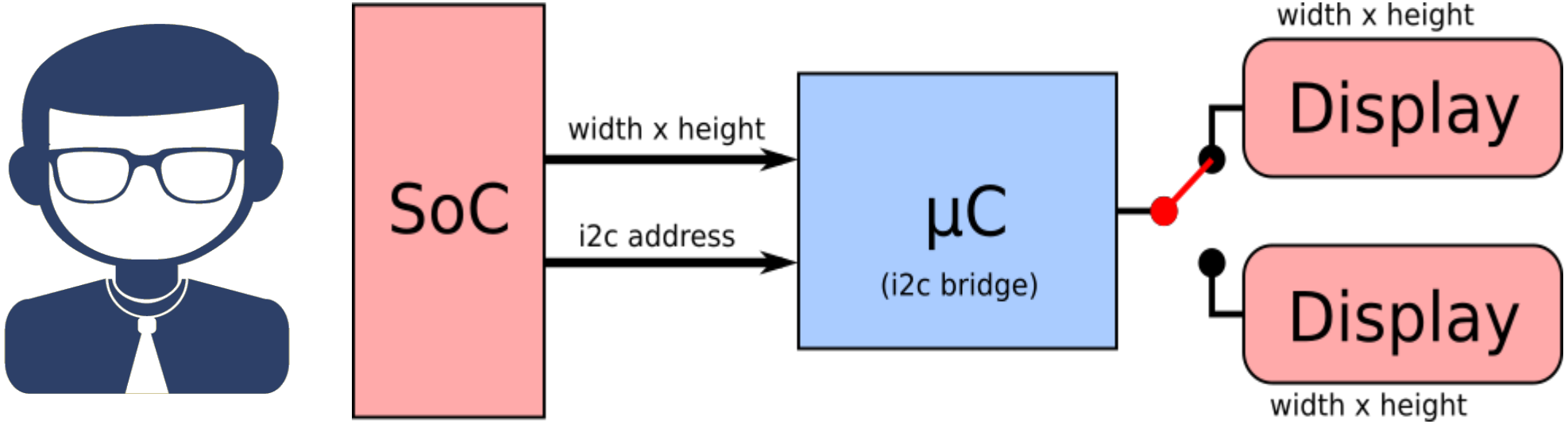
Connecting two displays: First option



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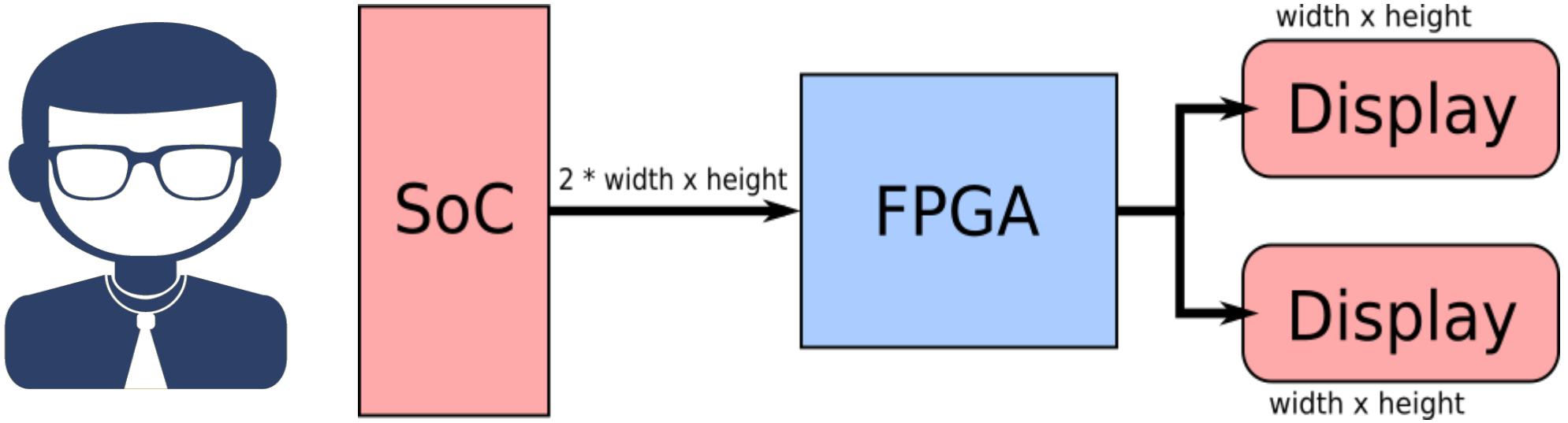
Connecting two displays: Second option



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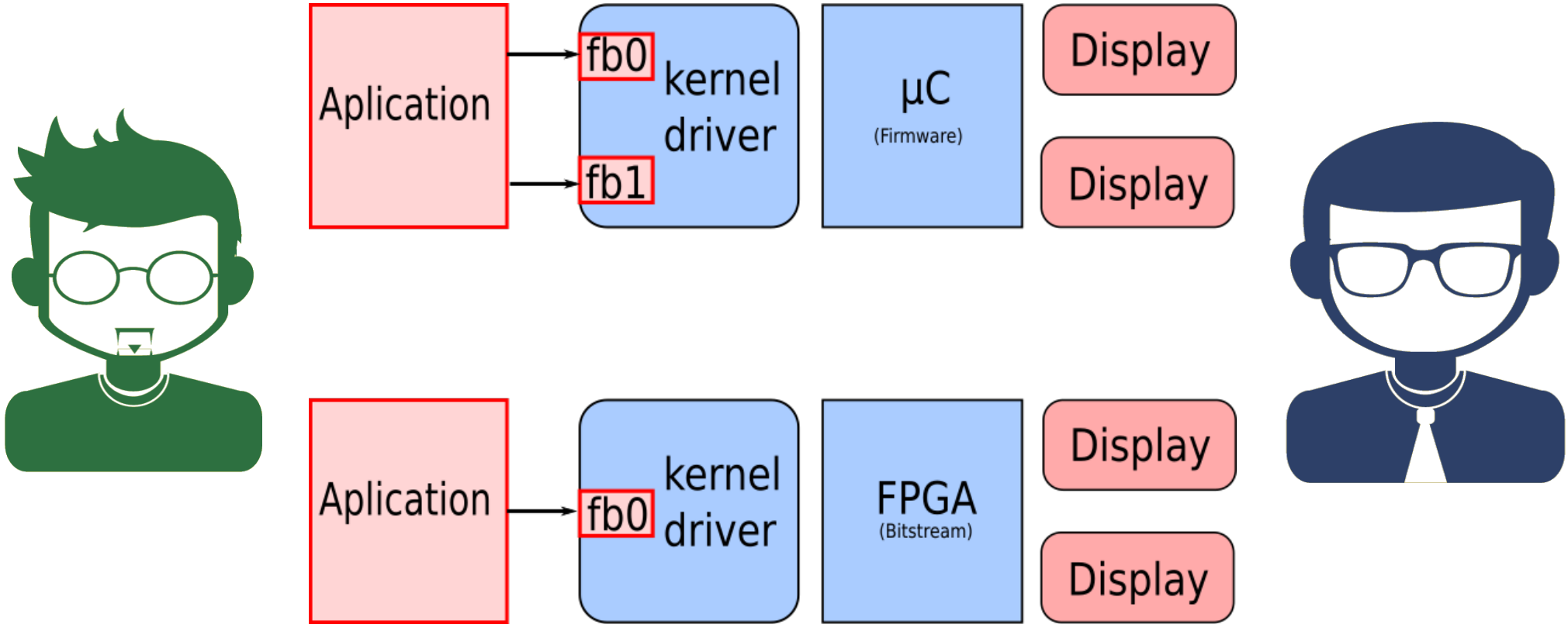
Critical components selection



Circuit design (Schematic)

- Let software team review the schematic
  - Write the devicetree file (architecture specific)
- Configure properly the muxer settings of the pins.
  - Enable of ICs.
  - Enable of regulators.
  - Look at pull-up and pull-down muxer possibilities.

Lessons learned

- Follow the rule. Upstream first.
- Work as close to mainline at early stages of development.
- Review the schematic from software POV can catch lots of errors.
- Try to do as much as possible the software development even before you have the first prototypes.
- Don’t play ping-pong. Work together.

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Any questions?