Cyclops

Yi-Fan Zhang

PL + Compiler + **IDE** => Cyclops

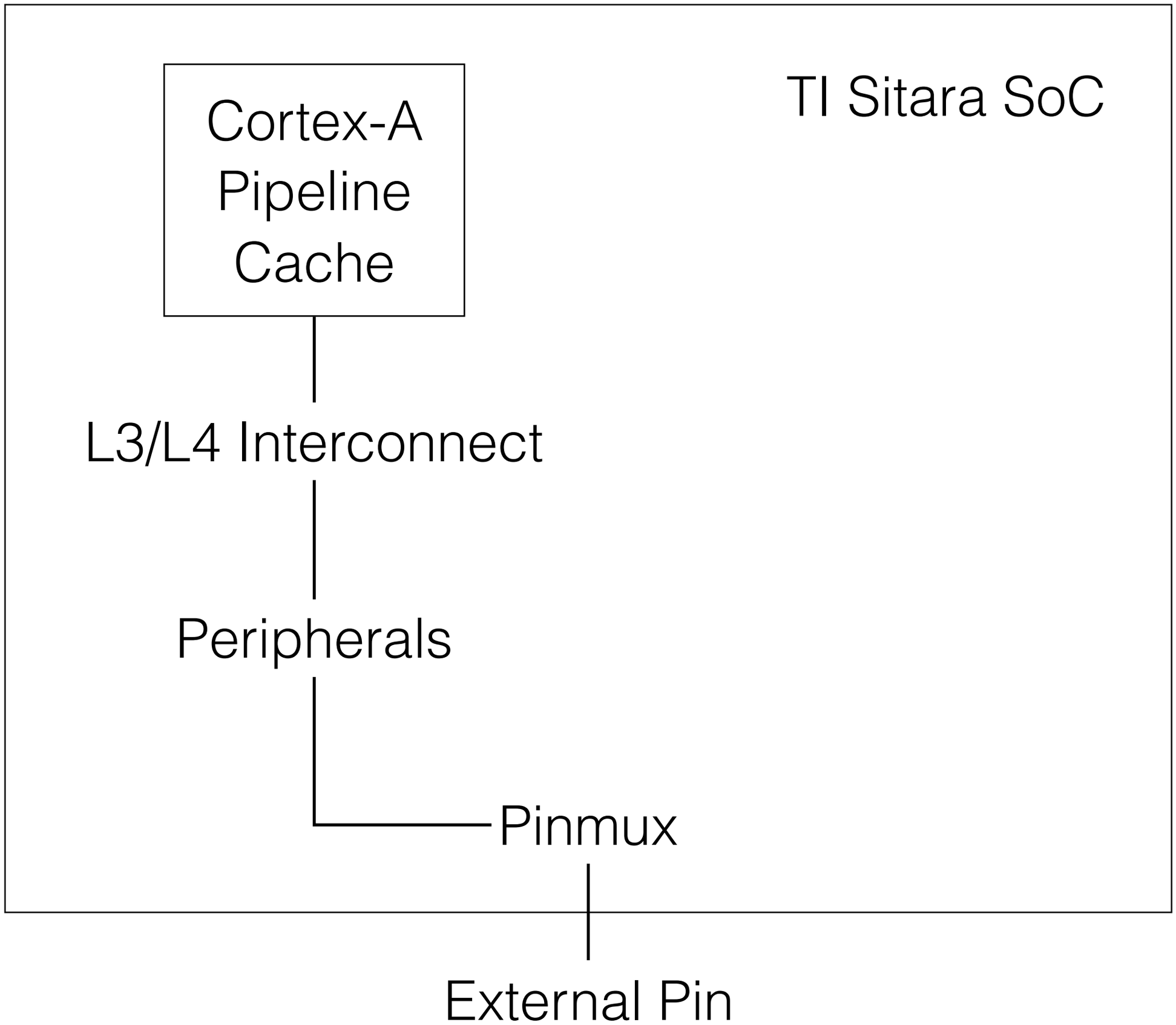
Cycle + **Op**eration**s** => **Cyclops**

Make PRUs **easy** to use.

Introduction

TI Sitara SoC

Cortex-A
Pipeline
Cache


TI Sitara SoC
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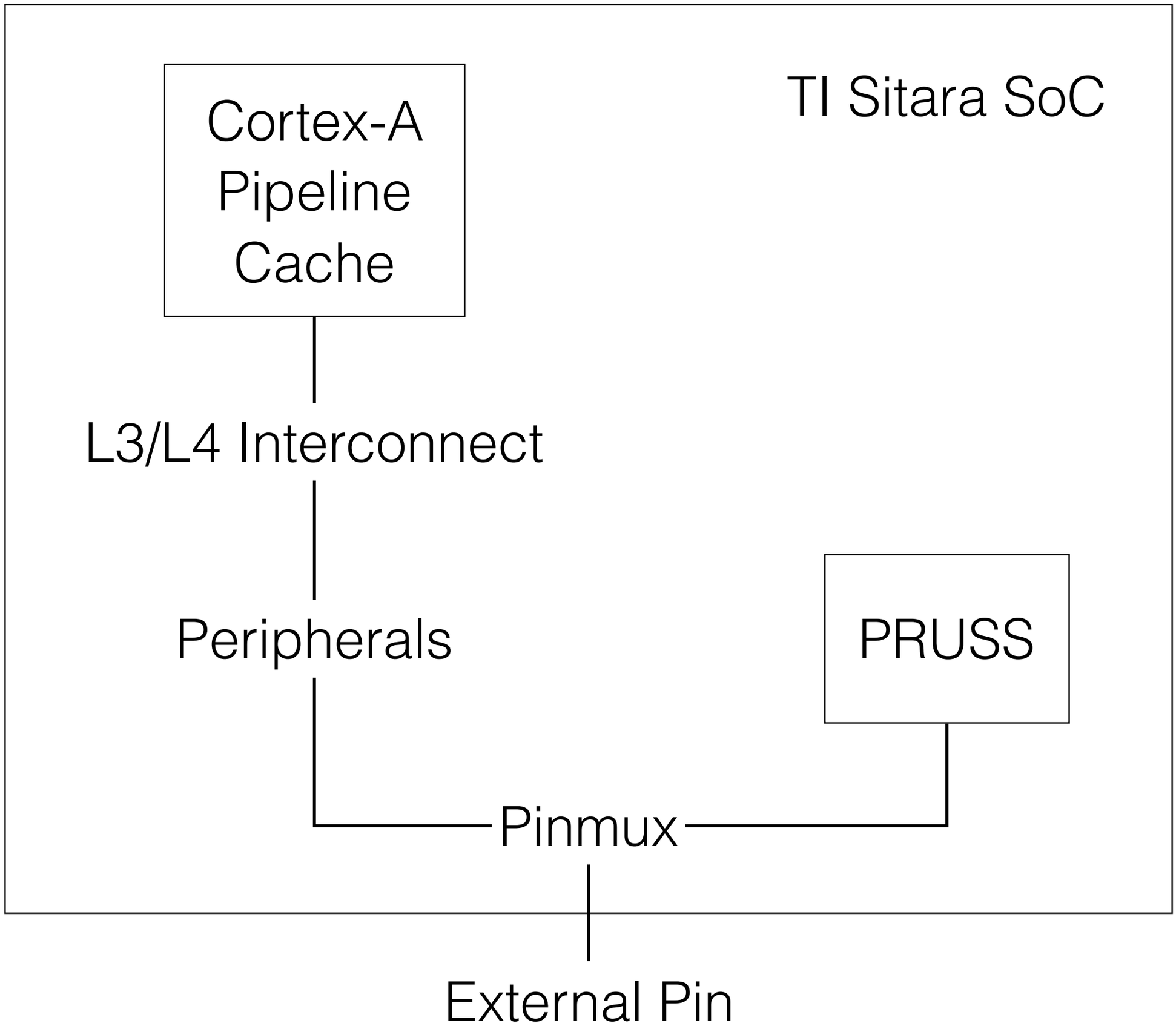
Pipeline
Cache
L3/L4 Interconnect
Peripherals
Pinmux
External Pin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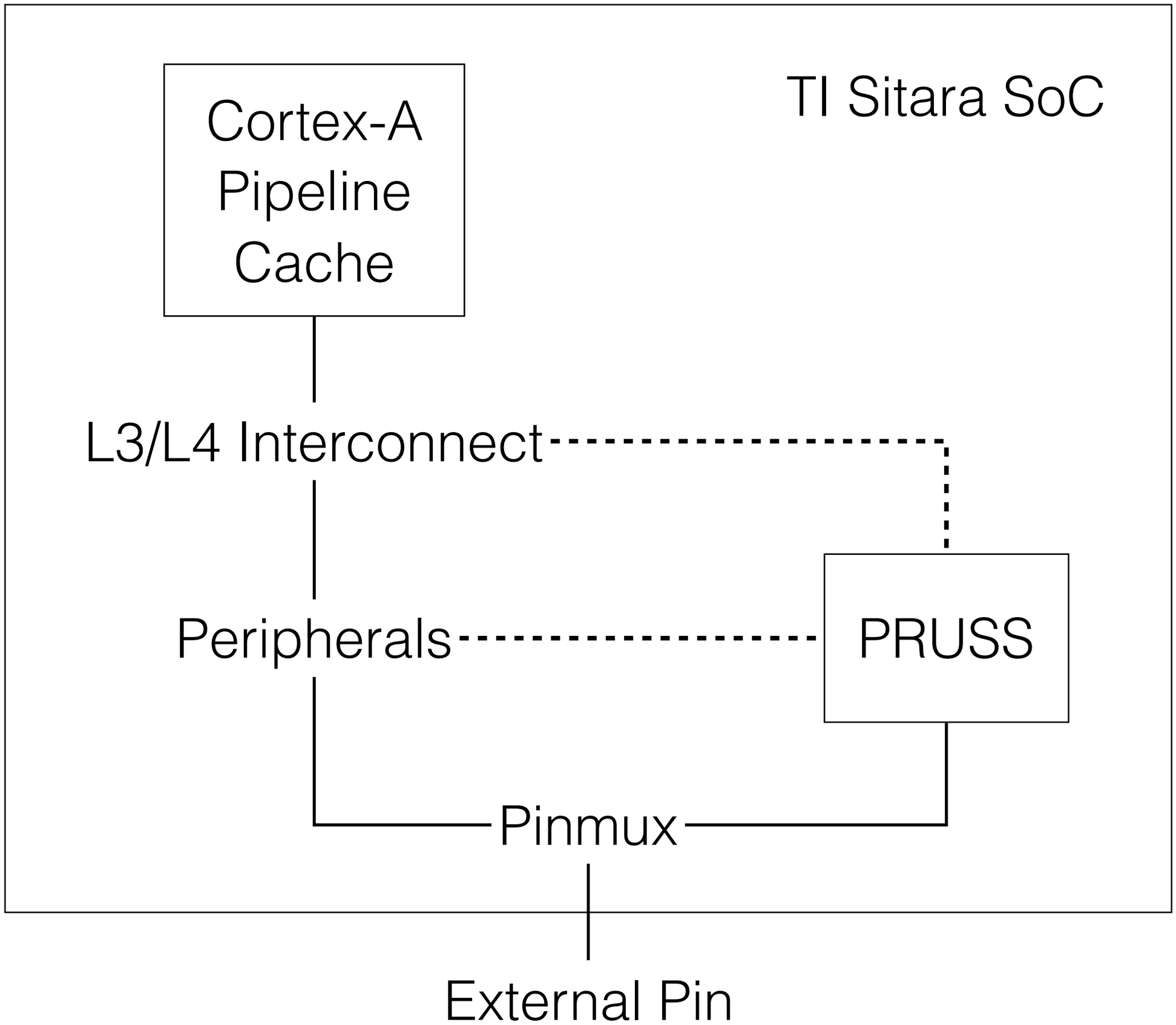
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Problem 1. Pinmux

HDMI

PRUSS

SPI

Pinmux

Pin 12

UART

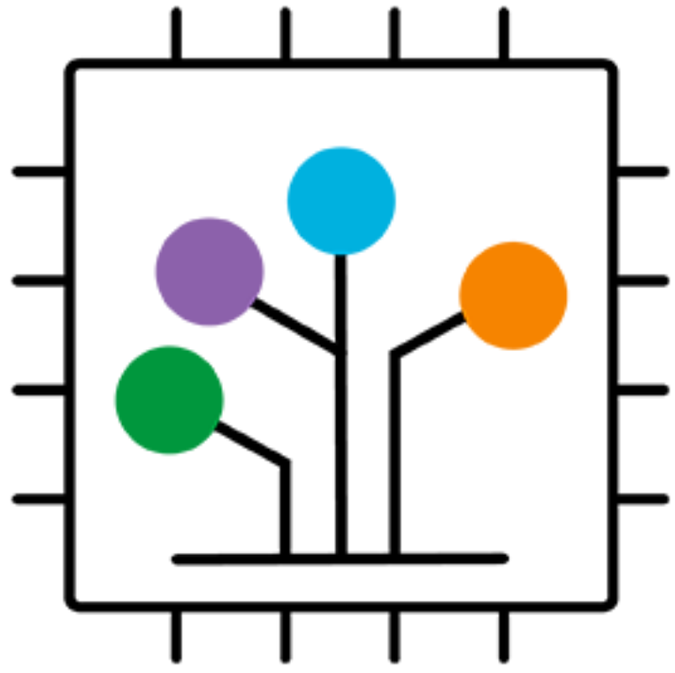
GPIO

I2C

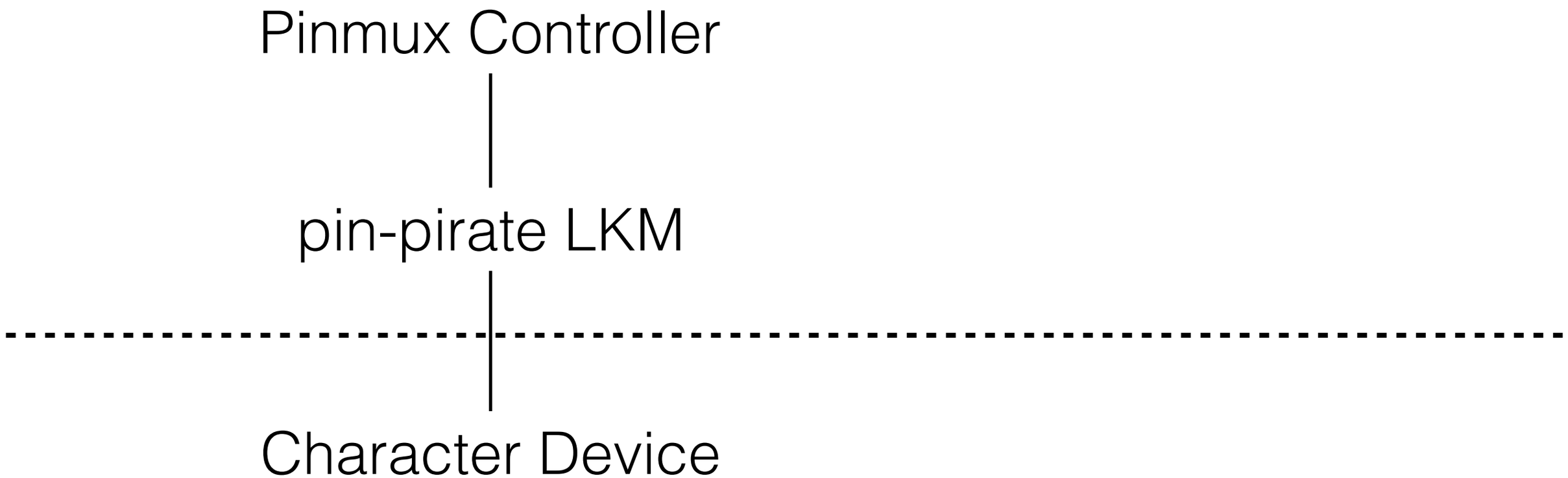
Pinmux

Pin 11

- Device Tree
  - Bone Cape Manager
  - Device Tree Overlays

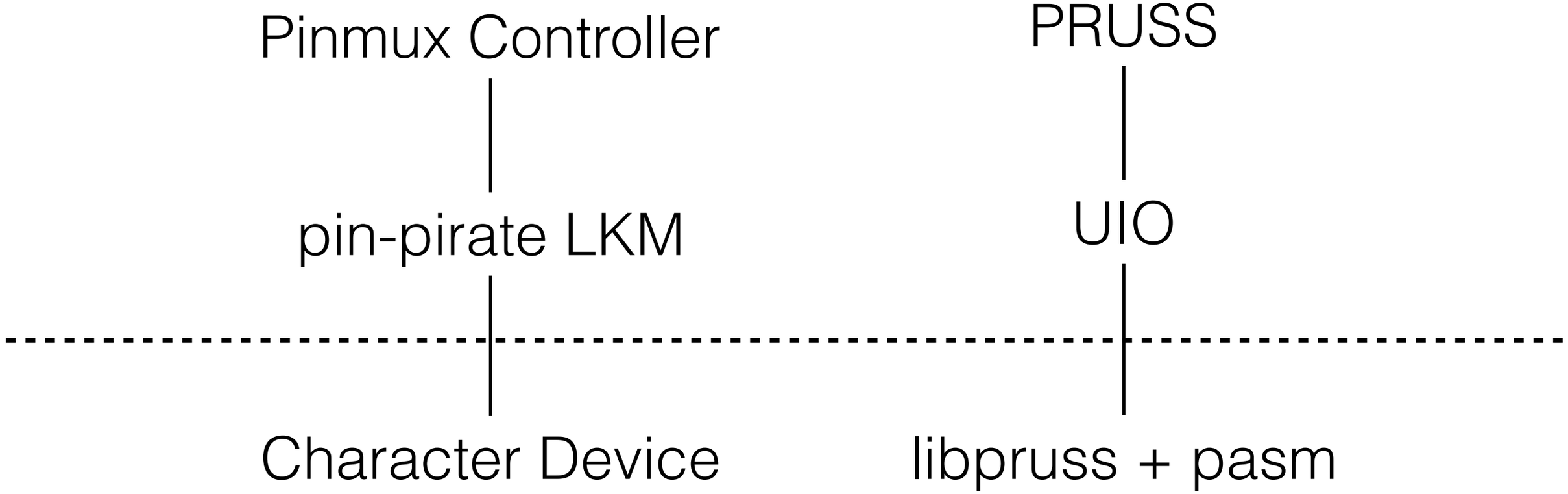


- Unreliable and not suitable
  - Reboot needed
  - Good for one time load otherwise kernel panics




```
echo 0x34 0x06 > /dev/pinpirate
```

Problem 2. Boilerplate

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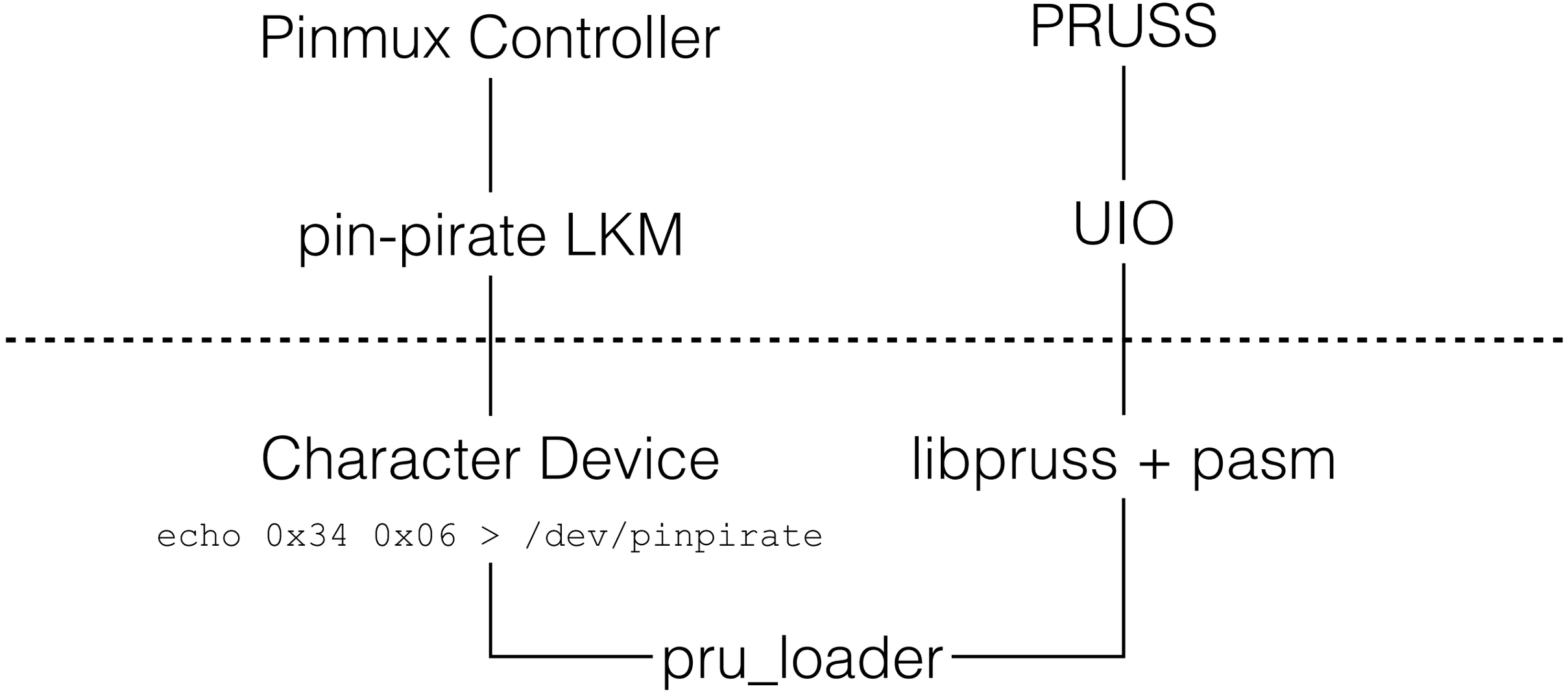


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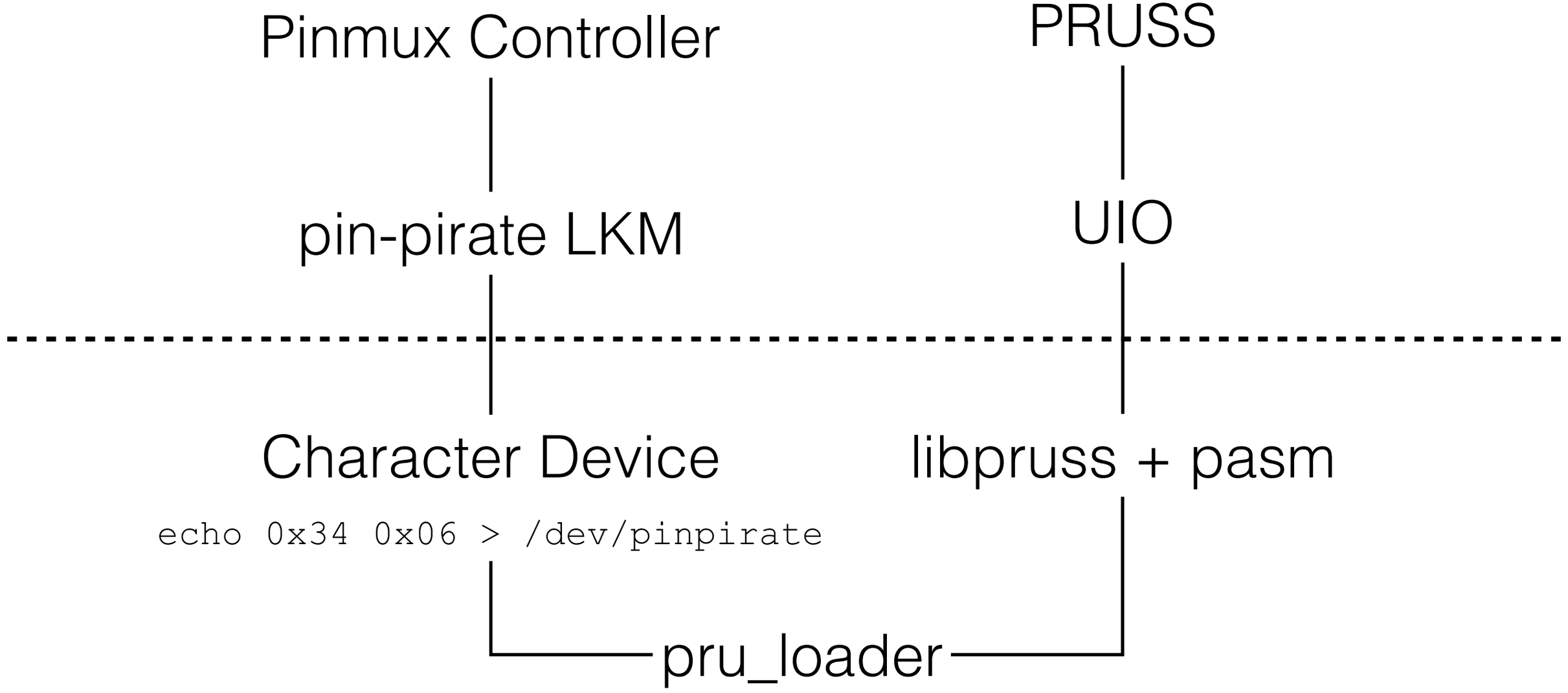

- pru_loader + shell scripts
  - Userspace Linux application
  - Handles assembling and loading PRU binaries
  - Facilitates communication between Linux and PRU

Problem 3. User Experience

Programming Language

- PRUs only support assembler and C/C++
- Create a javascript style language, Cyclops, with minimal learning curve for easy prototyping

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- Non-optimizing compiler
- Easy to map language constructs directly to assembly code
- Implemented in javascript to run completely in the browser

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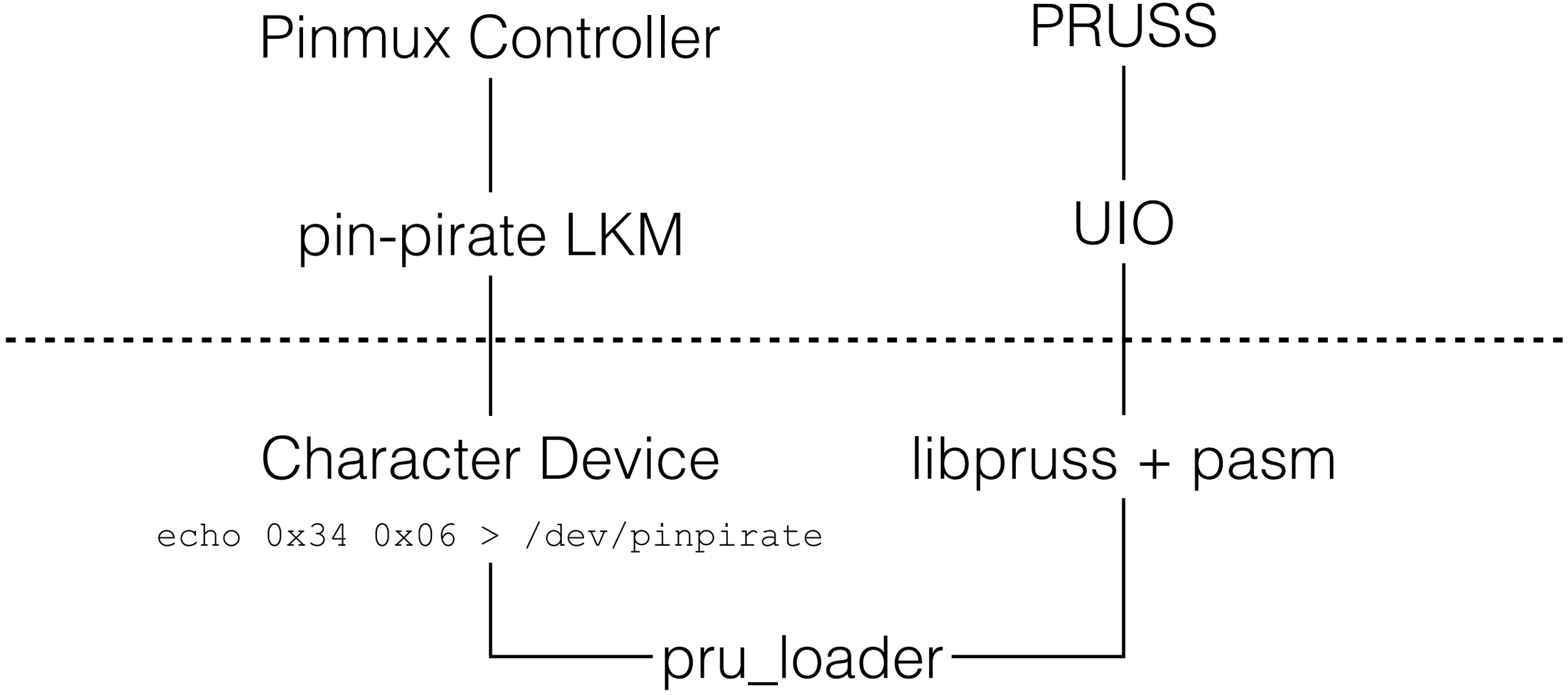
IDE

- User facing part that integrates everything in a browser based IDE
- Allows writing in Cyclops or PRU assembler

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Pinmux Controller

pin-pirate LKM

Character Device

PRUSS

UIO

libpruss + pasm

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pru_loader

web server

Browser

compiler + IDE

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References

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Demo