



Radio Microcontroller for Fabrication

sddec26-10

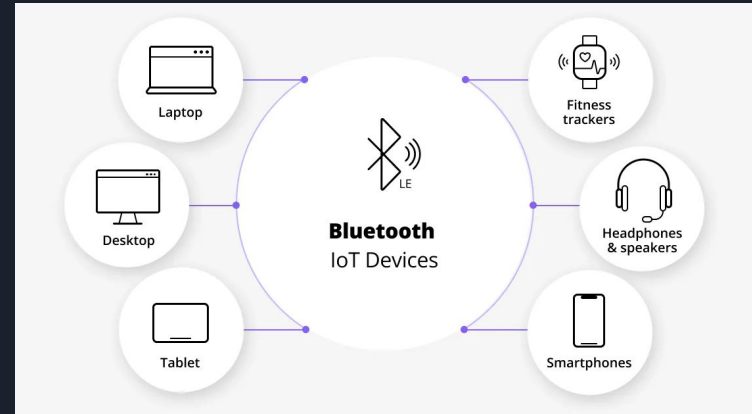
Design - Part 1 (High Level)

Project Background

An ASIC (Application Specific Integrated Circuit) Bluetooth Low Energy microcontroller that is:

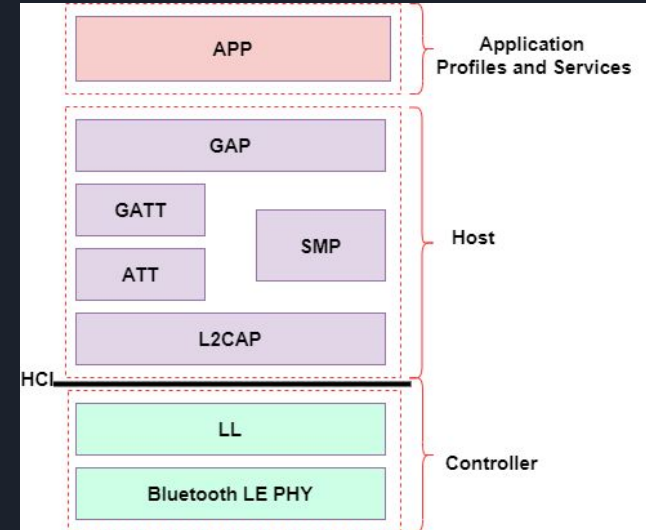
- Open-Source
- Fabricatable
- Realizable

With the intention of designing a fully useable and modifiable BLE microcontroller



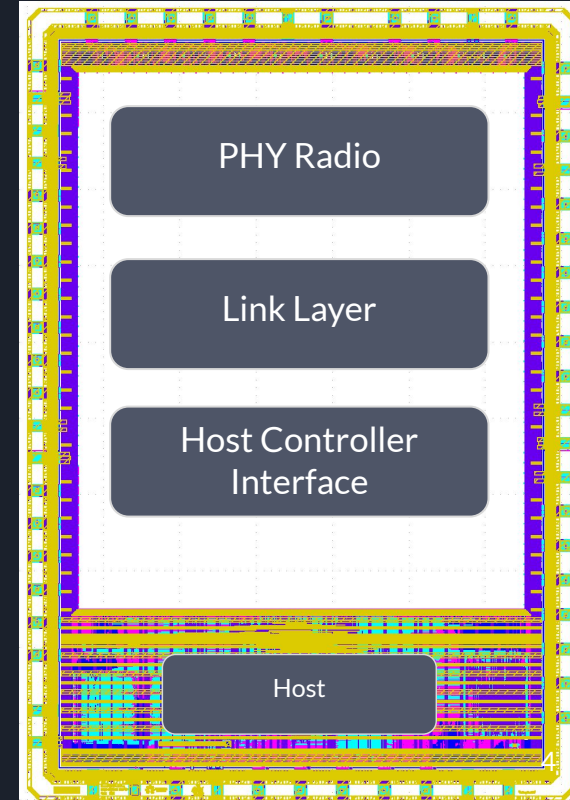
Bluetooth Low Energy and our SoC

- Bluetooth Low Energy
 - Lower data rates than typical Bluetooth. For a more bursty type of communication
- Bluetooth can be divided into these layers
- Host and Controller all on one System on Chip
 - Host running on a RISC-V Core
 - Our Link Layer (LL) as custom hardware (digital)
 - Our PHY as custom hardware (analog —mostly)
- Our **major design concern** is the **Controller** portion
 - Software libraries can be used for Host layers

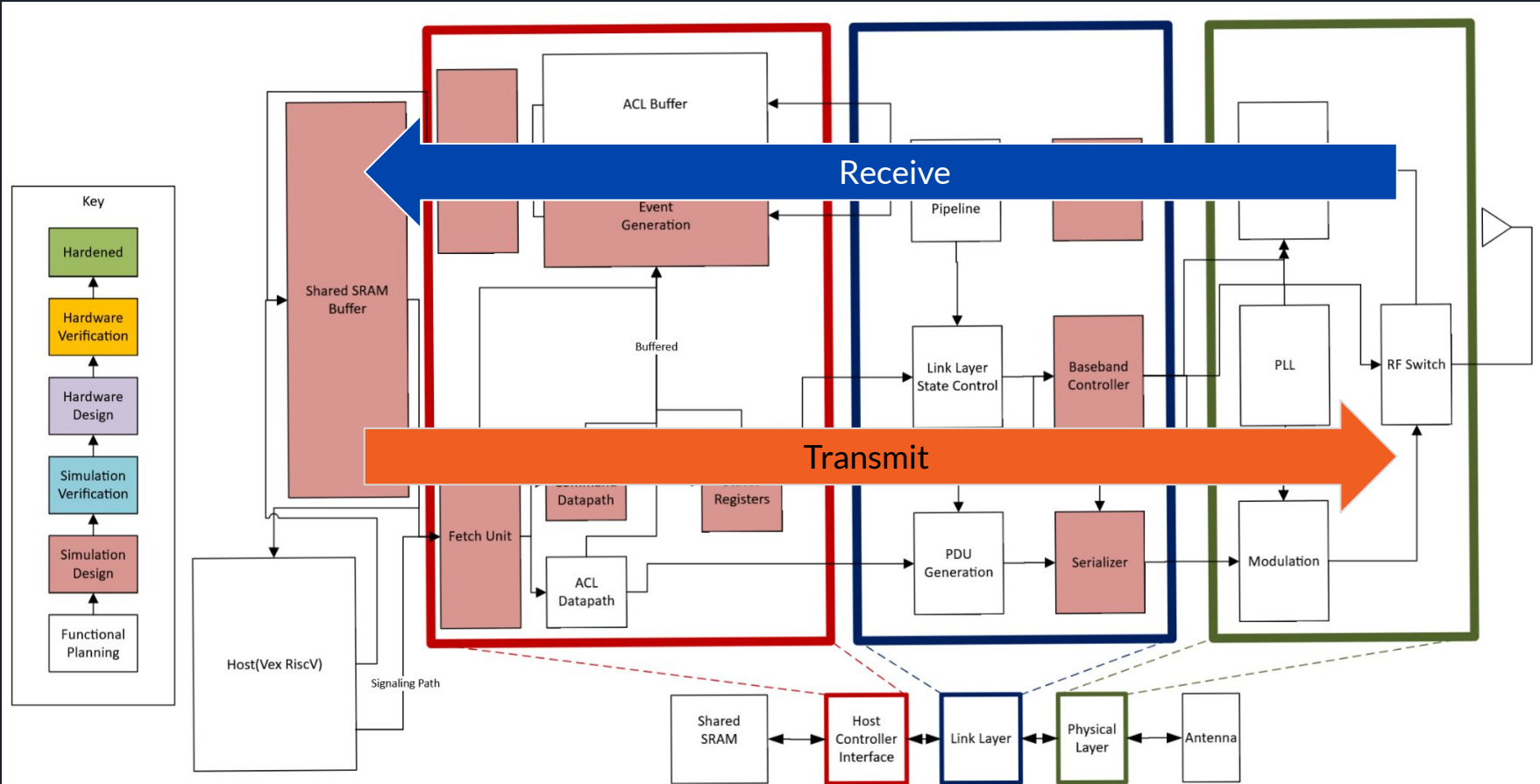


Design Context: SoC

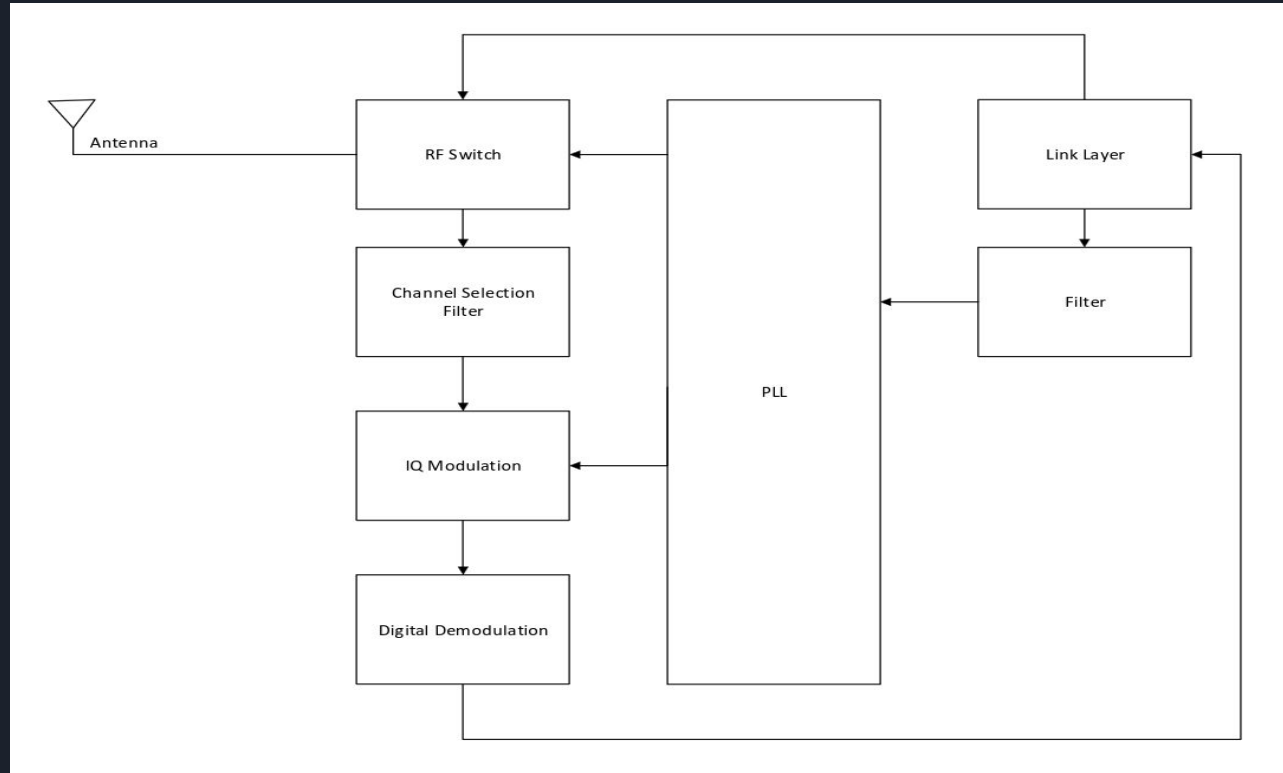
- Skywater 130nm Process
- Working on the Caravel template
 - Management Core (to be used as Host) given to us
- PHY Radio portion is responsible for the physical transmission and receiving of data
- Link Layer portion is responsible for packet generation, state management, precise timing, connections, etc.
- Host Controller Interface for the barrier between the Host and Controller



System Diagram with Progress Tracking



PHY Architecture





Questions