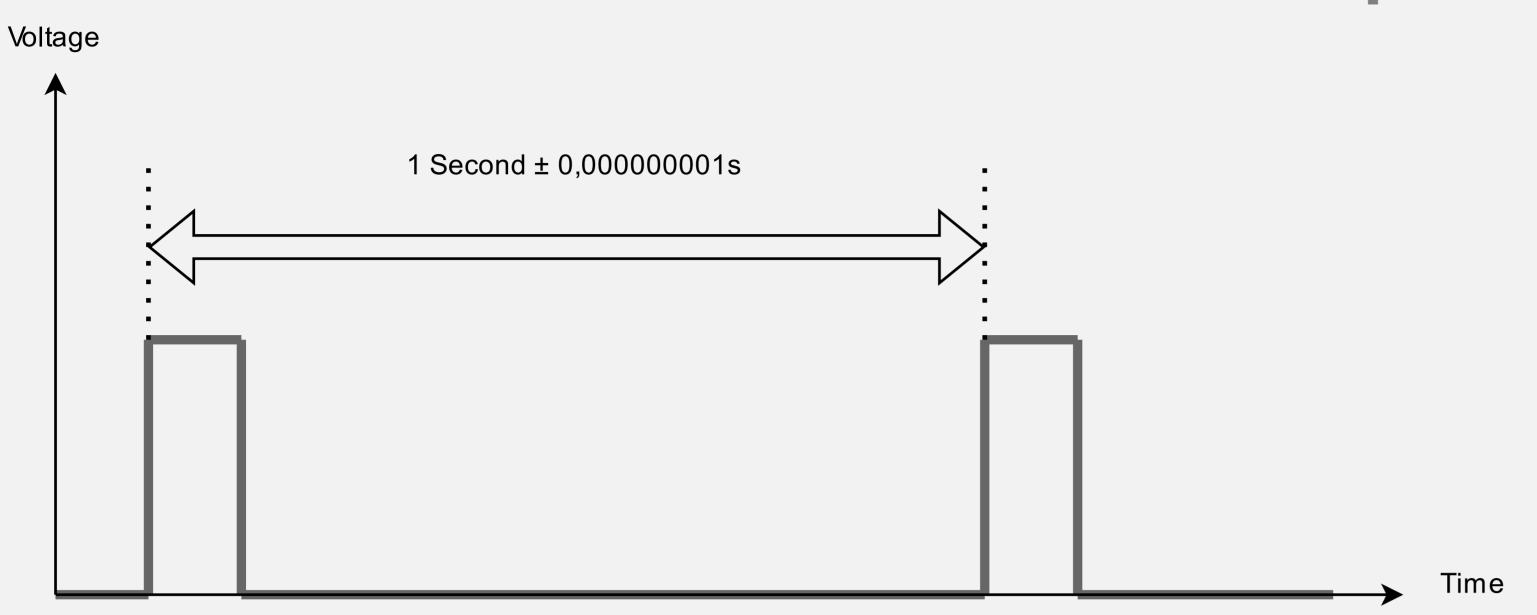
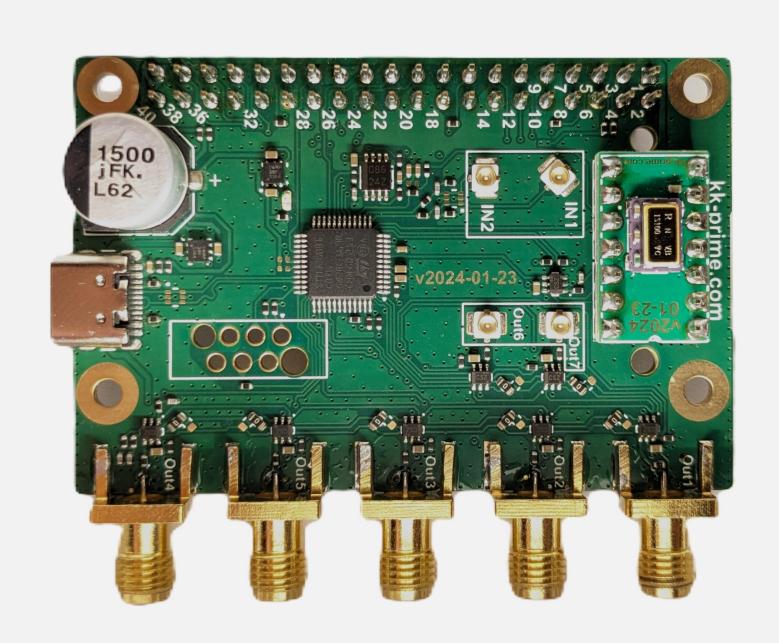
nnovationlab



RefClock

A time standard for the Raspberry Pi



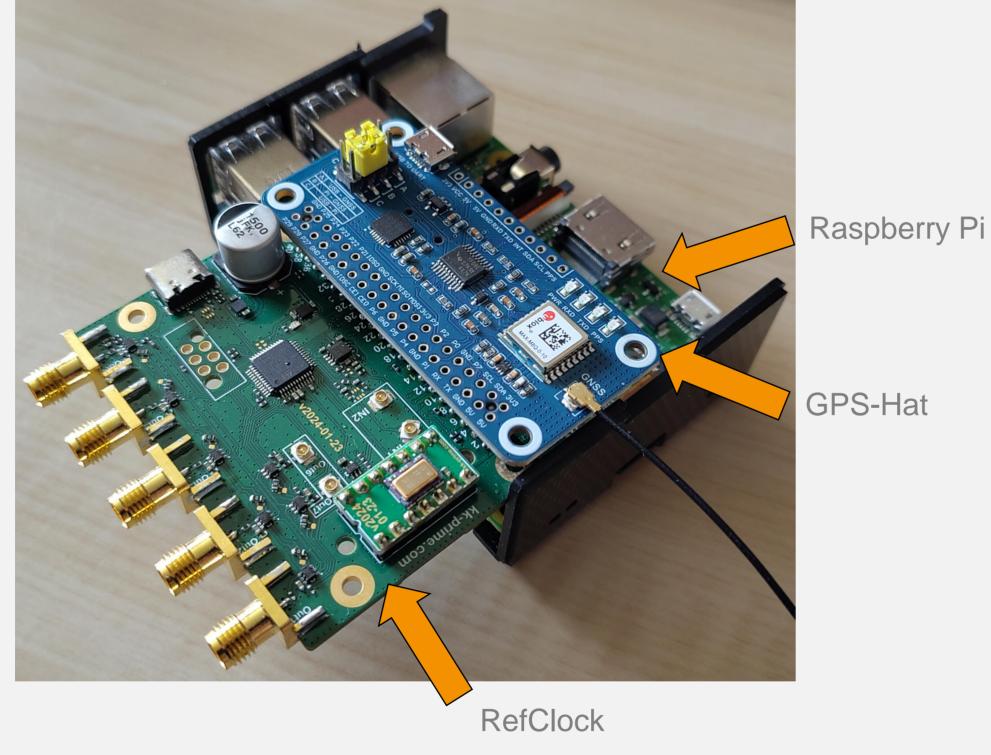


Motivation and goals

- Frequency and time standard in one
- Keeping external devices accurate
- Does not exist as a Raspberry Pi module
 - Configuration via Pi
 - Time standard for Pi

Contributions

- Comparing internal pulse with external pulses
- Phase jump
- Saving and loading configuration
- Monitoring system status



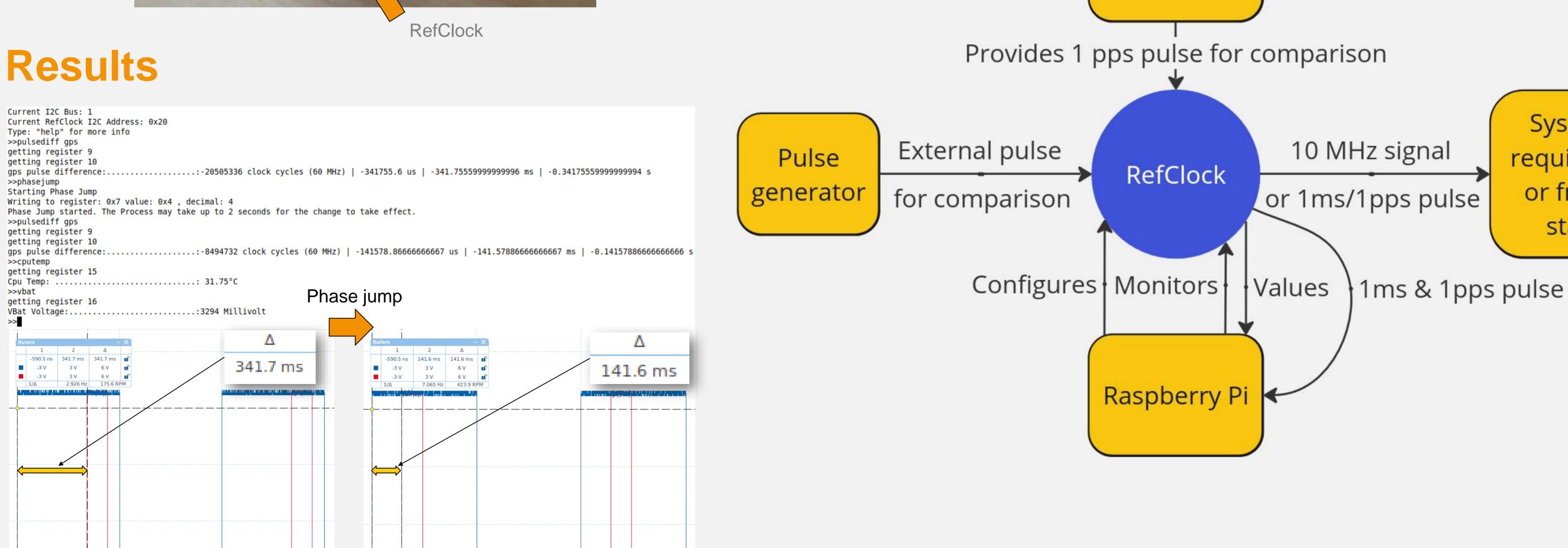
Challenges

- Steep learning curve: STM32 is not an Arduino
- Understand electronic engineering
- Keep hardware configuration consistent
- Debug with hardware
- Using as little resources as possible
- Impact on other software components
- Changing requirements

Architecture and technology

- STM32 Microcontroller
- 10 MHz Master Clock
- 7 Configurable outputs
 - 10 MHz signal
 - 1 ms pulse
 - 1 s pulse
- GPS-Hat on top for comparison
 - Generates 1 s pulse from GPS signal
- 2 additional inputs for comparison signals
- Communication with Raspberry Pi via I2C
- Accuracy in nanoseconds (10 ppb)

GPS Hat



System that

requires a time

or frequency

standard