

# Raios Cósmicos nas Escolas

## O Hardware e suas possibilidades

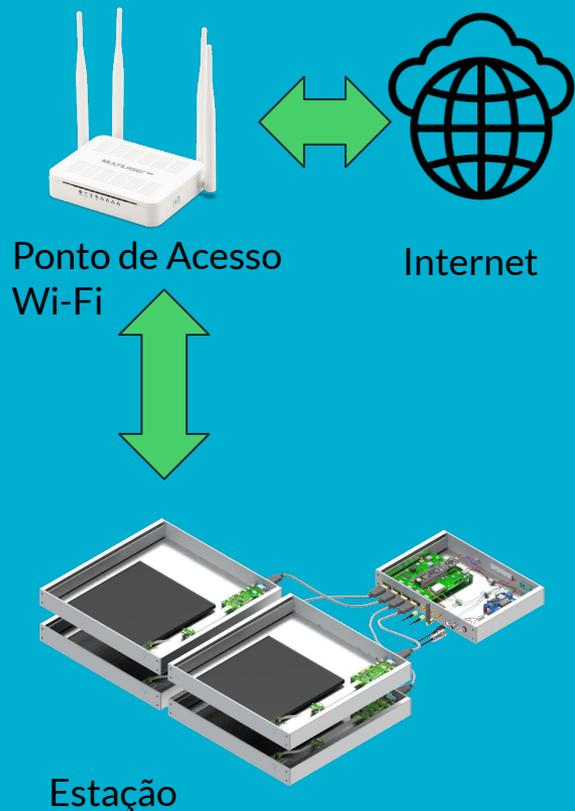
G. Saito, M. Leite, M. Kuriyama, R. de Paula, R. Menegasso

Instituto de Física da USP

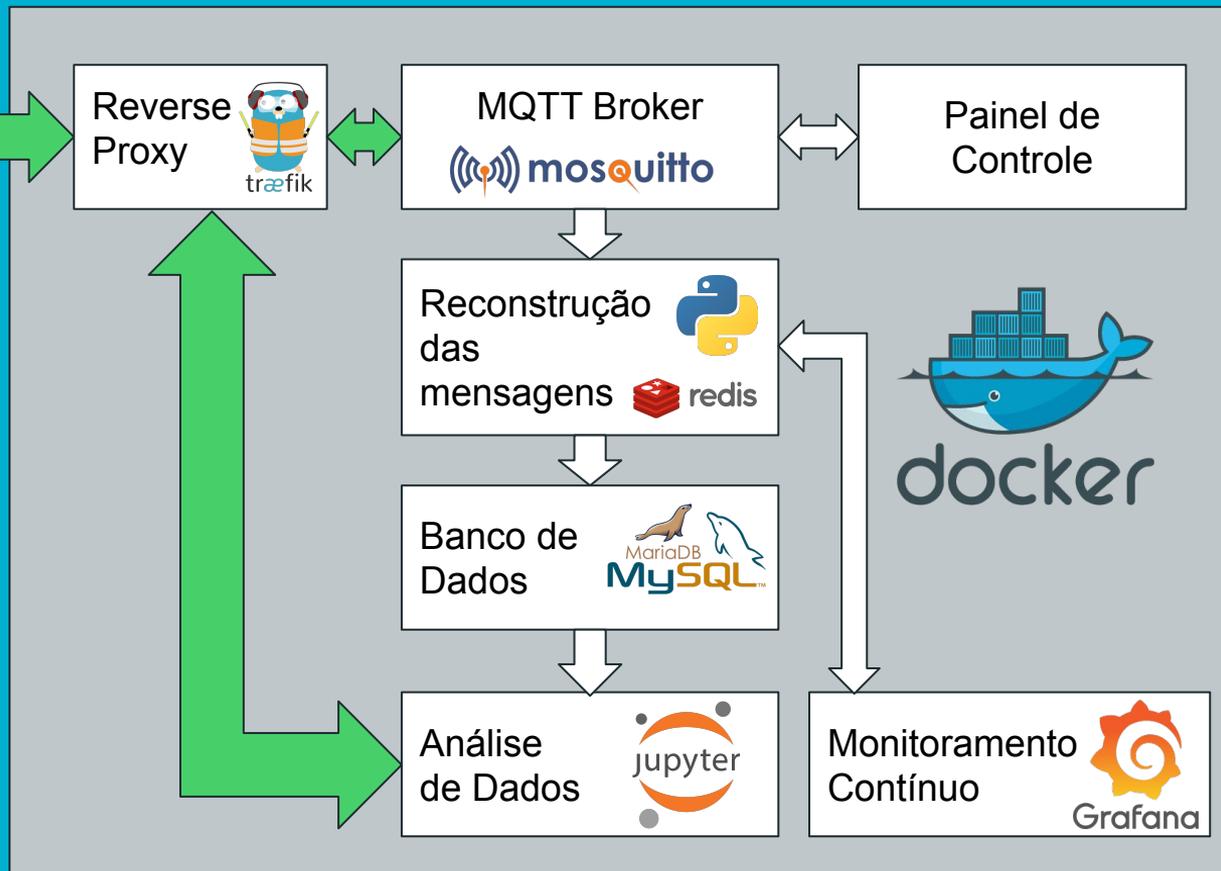


24 de Fevereiro de 2021

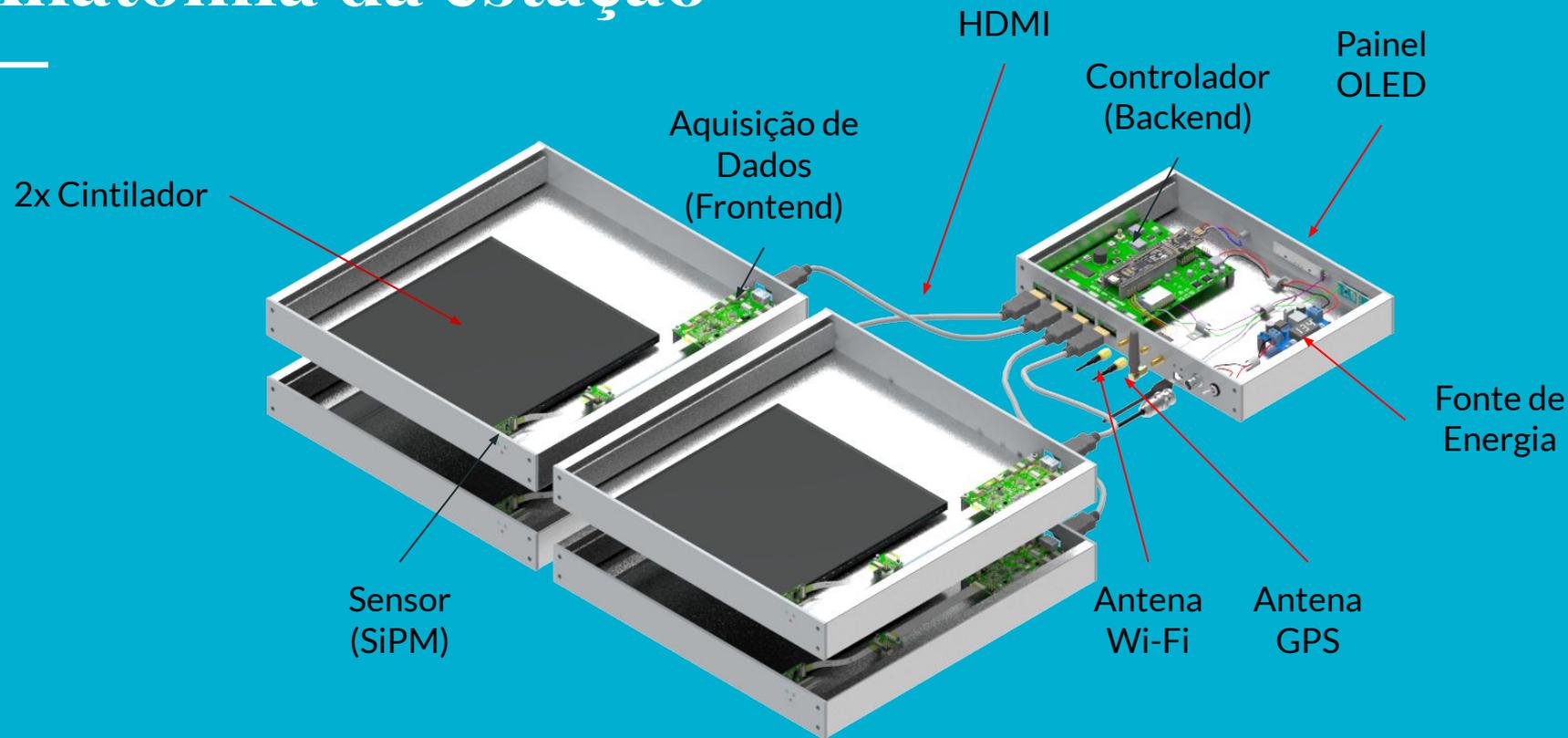
# Hardware



# Software



# Anatomia da estação



# Funcionamento

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## Requisitos do local:

- Energia elétrica
  - Fonte de laptop
- Conexão com a Internet
  - Wi-Fi
  - Ethernet (cabo)
- Sinal de GPS
  - A antena pode ficar longe da estação
  - Mais sensível que a antena do celular



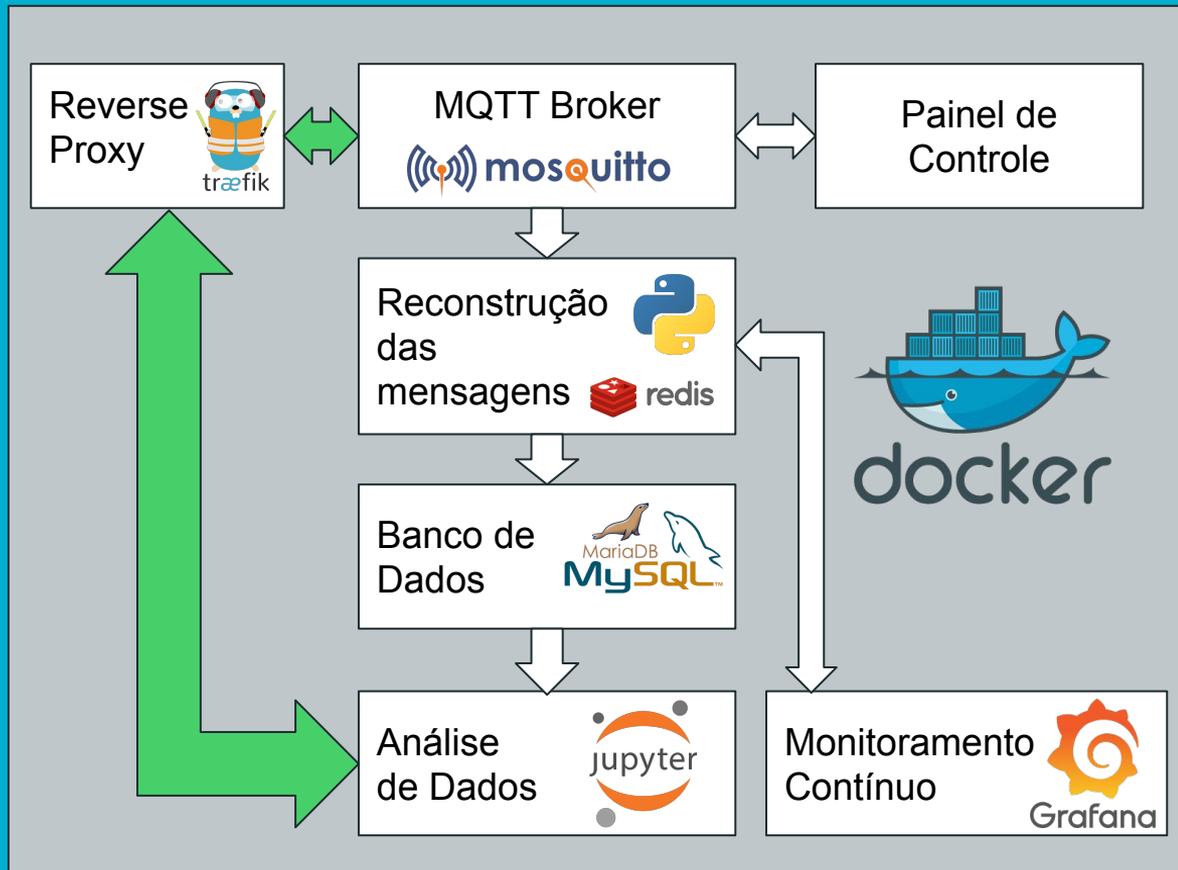
# Software

Para rodar o software, tão simples quanto:

```
$ git clone gitlab.com/cosmicserver
```

```
$ docker compose up
```

- Funciona em qualquer máquina Linux
- Configuração pronta

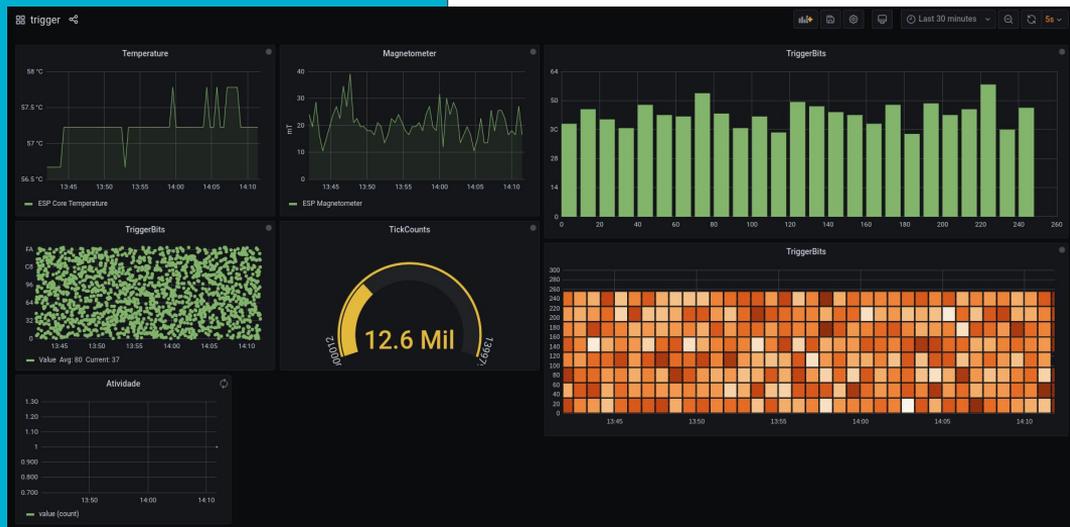
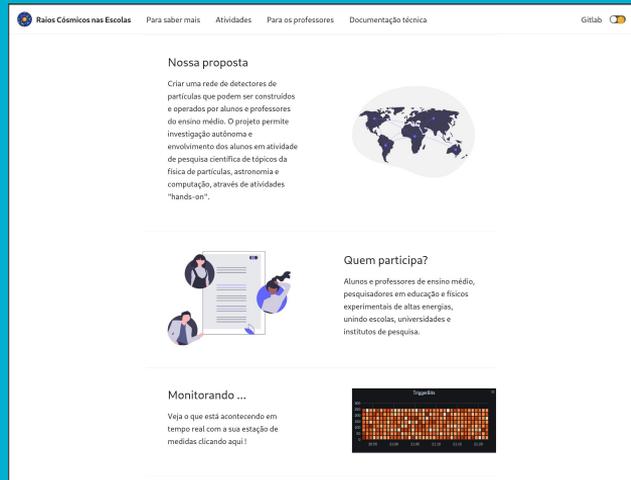


# Grafana

## Visualização em tempo real do sistema e das estações

- Eventos
- Status das Estações
- Condições de operação
- Mapa
- Servidores

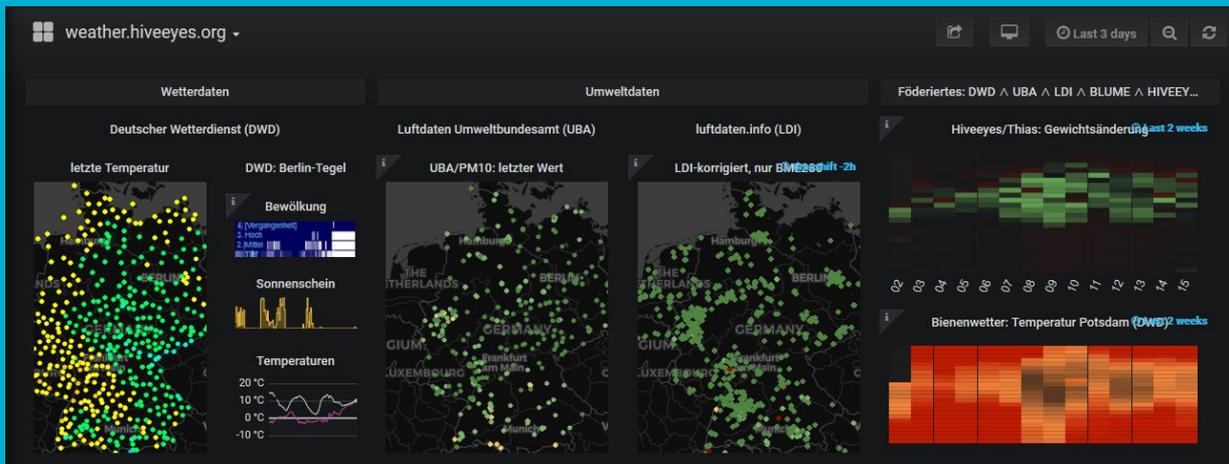
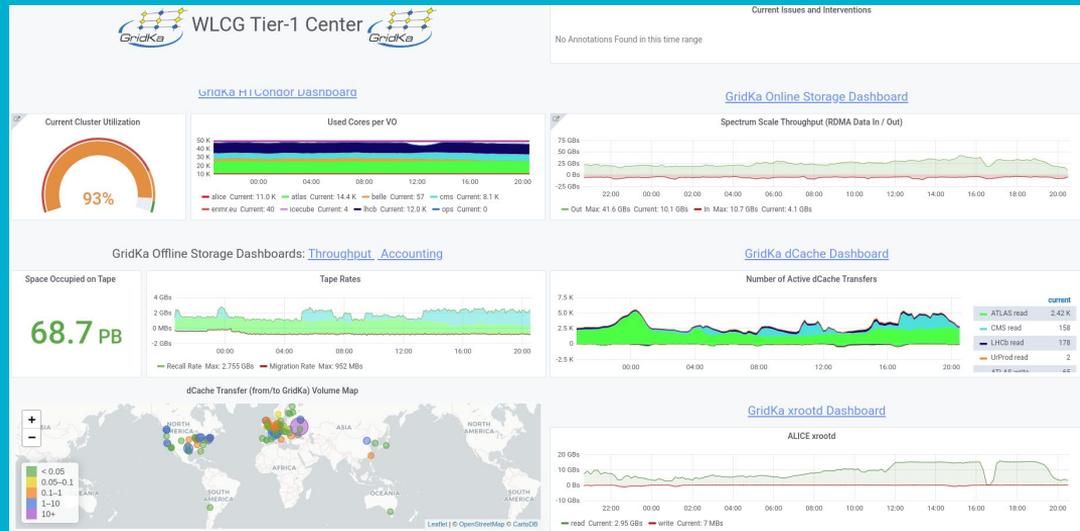
Acessível em [raioscosmicos.if.usp.br/grafana](https://raioscosmicos.if.usp.br/grafana)



# Possibilidades

## Muitas organizações usam Grafana

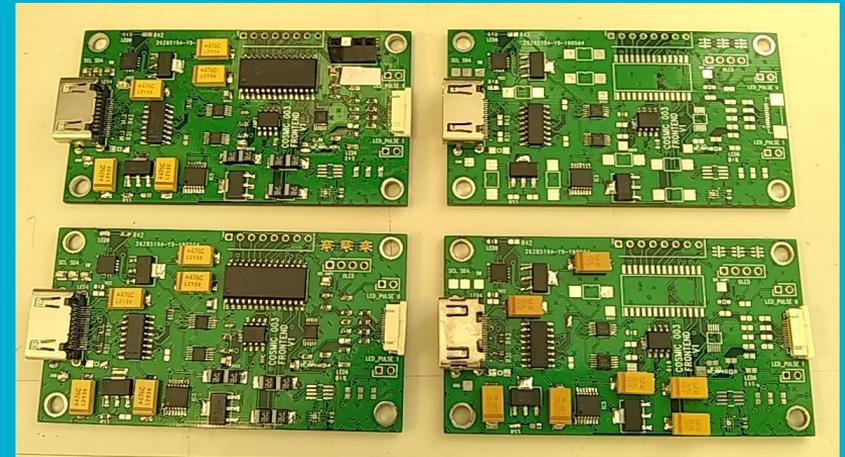
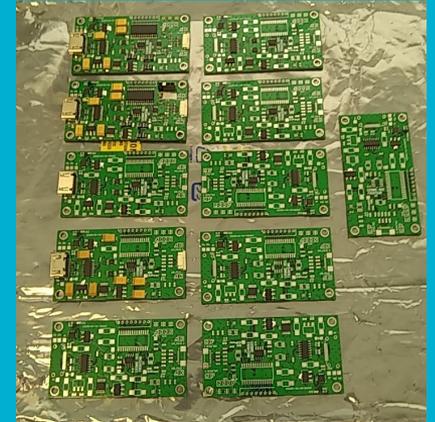
- Qualidade dos dados
- Análises em tempo real
- Mapas
- Filtros
- Alarmes



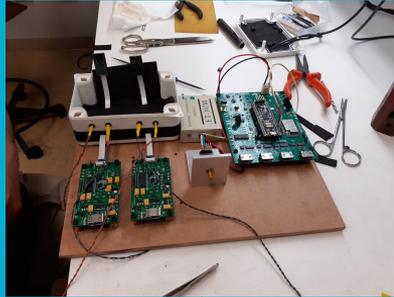
# Status das estações

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- 1 estação montada
- Material para 3~4 outras estações
- Parado desde Março/2020



# Evolução do Hardware



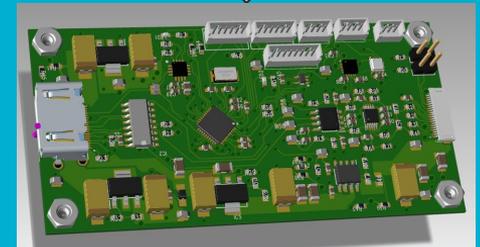
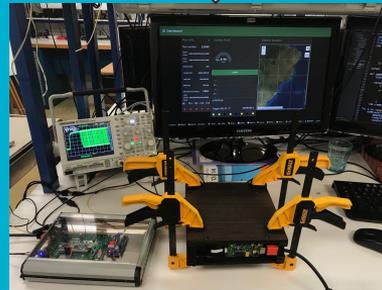
07/2018

06/2019

08/2019

01/2020

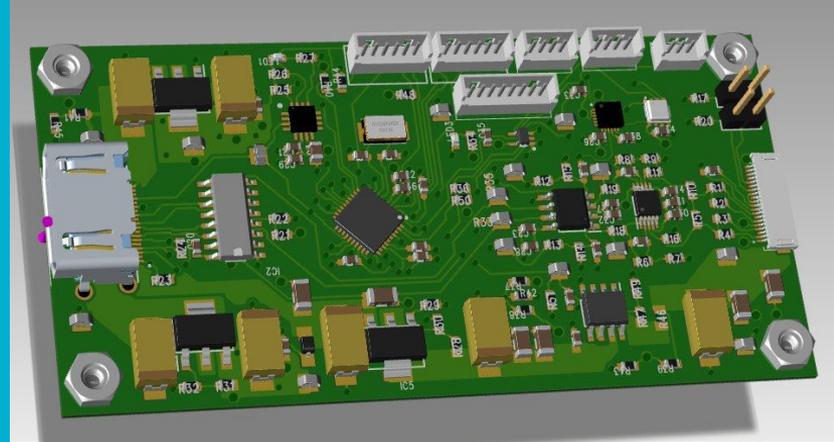
02/2021



# Nova versão do Hardware

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- Segunda versão
- Mais simples de operar
- Mais possibilidades de uso
- Experiência da versão anterior
- Enviando para fabricação



Feedback é sempre bem vindo

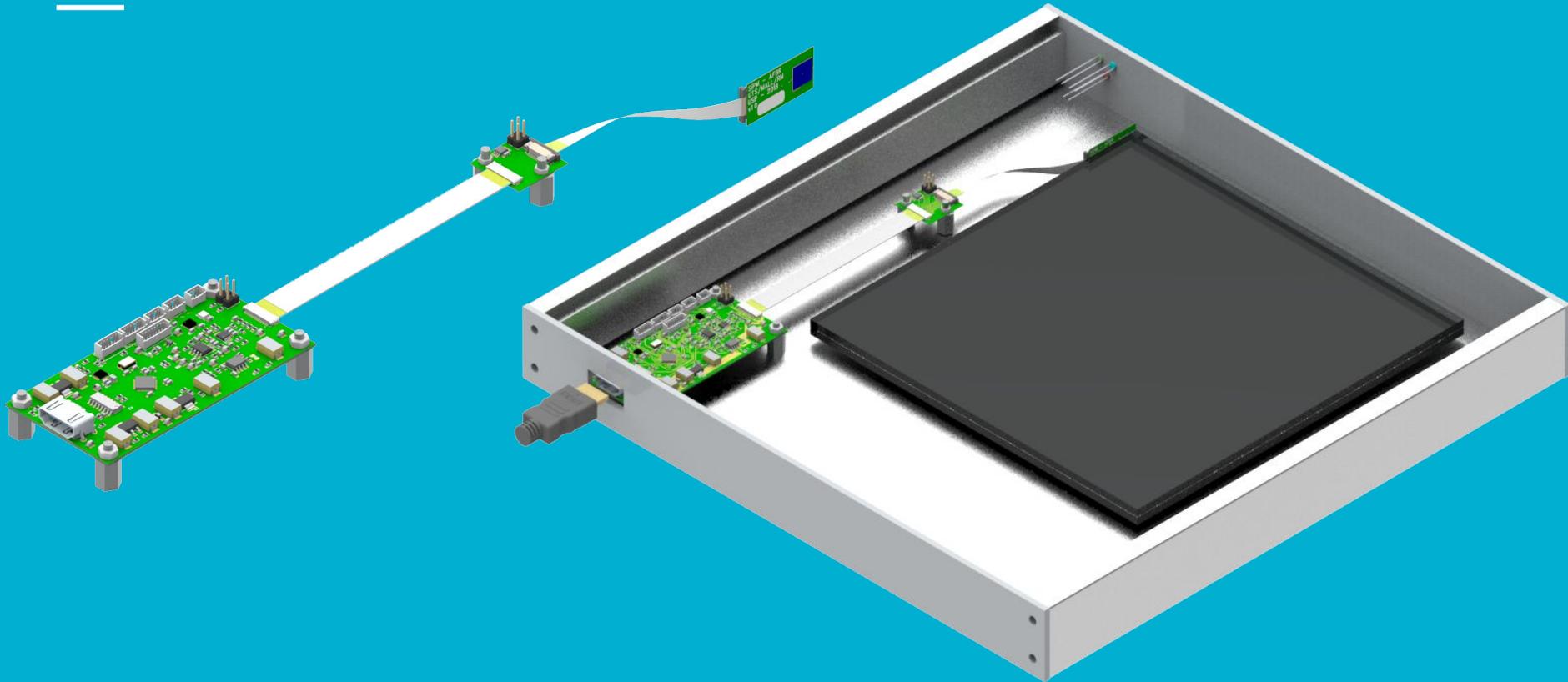
Obrigado!

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# Backup

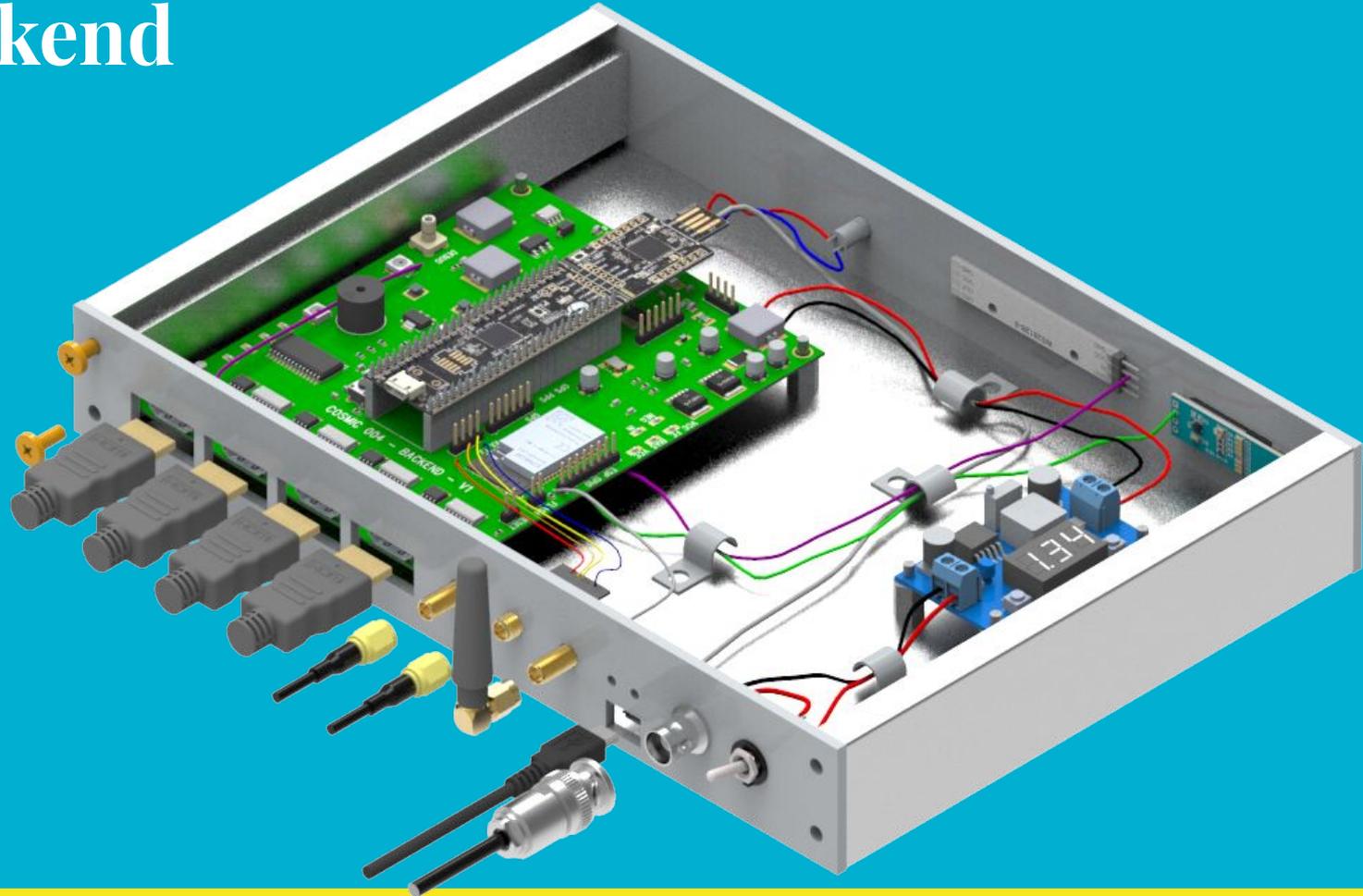
# Frontend + SiPM (Cintiliador)

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# Backend

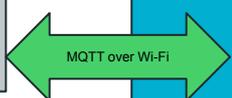
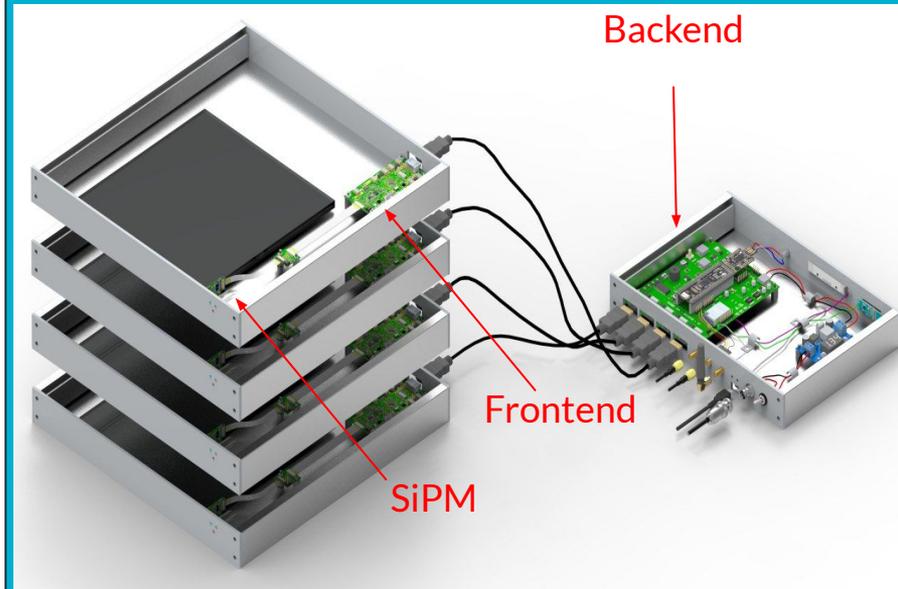
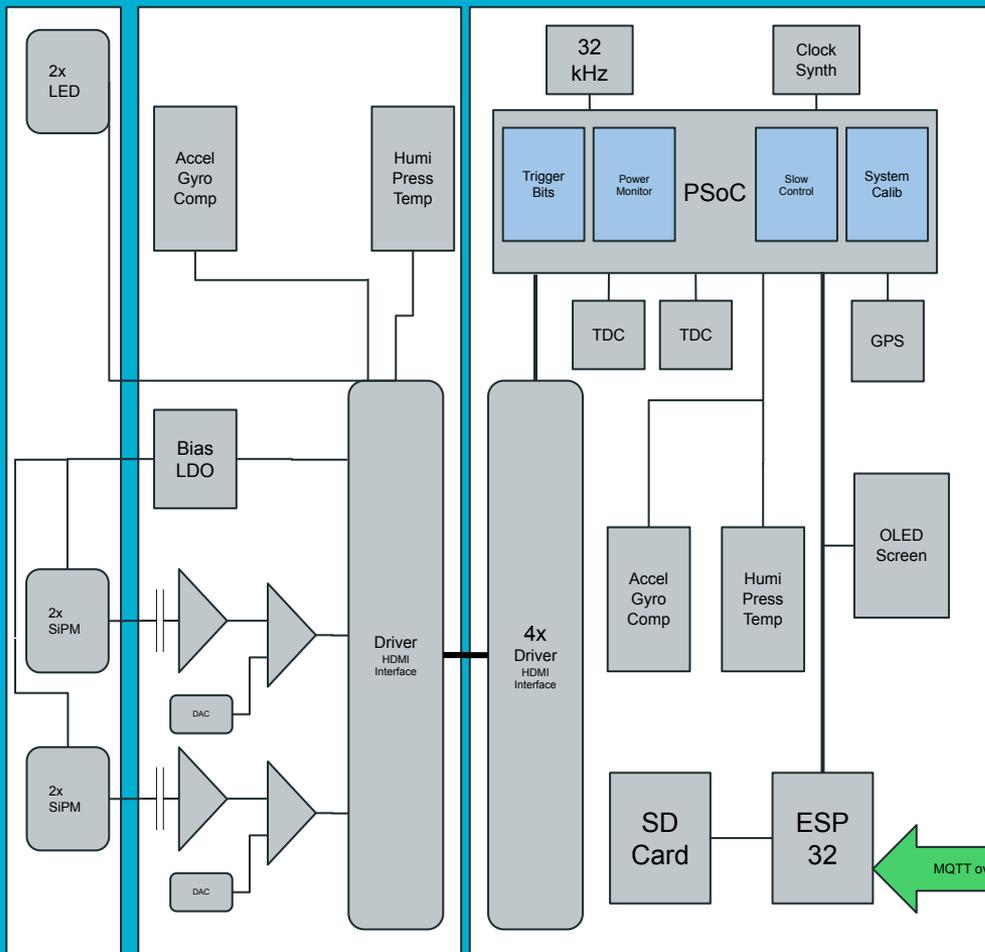
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# SiPM

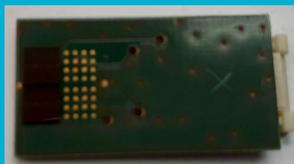
## 1 a 4 Frontends

## Backend

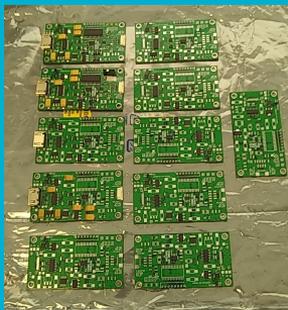


# Placas desenvolvidas

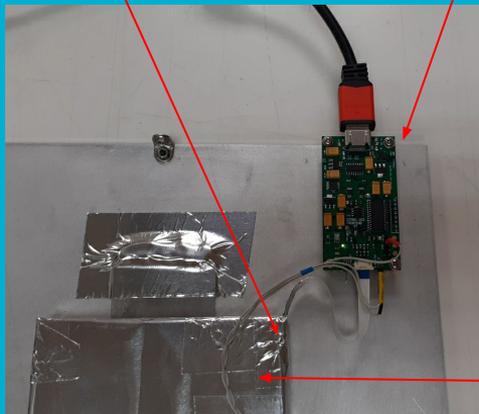
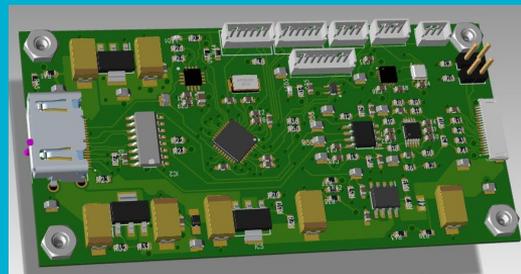
SiPM



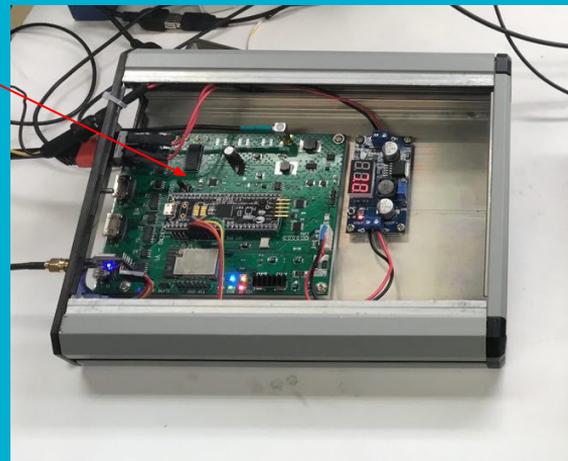
Frontend



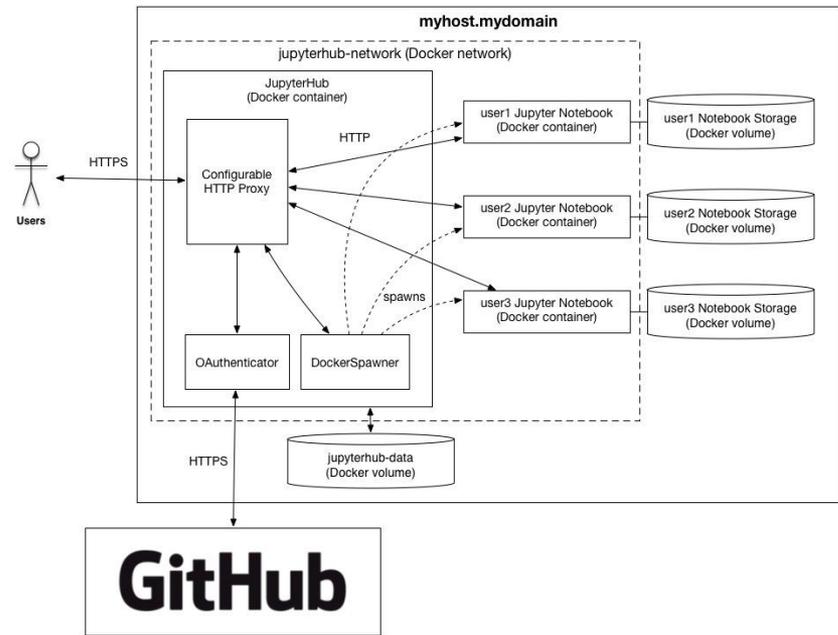
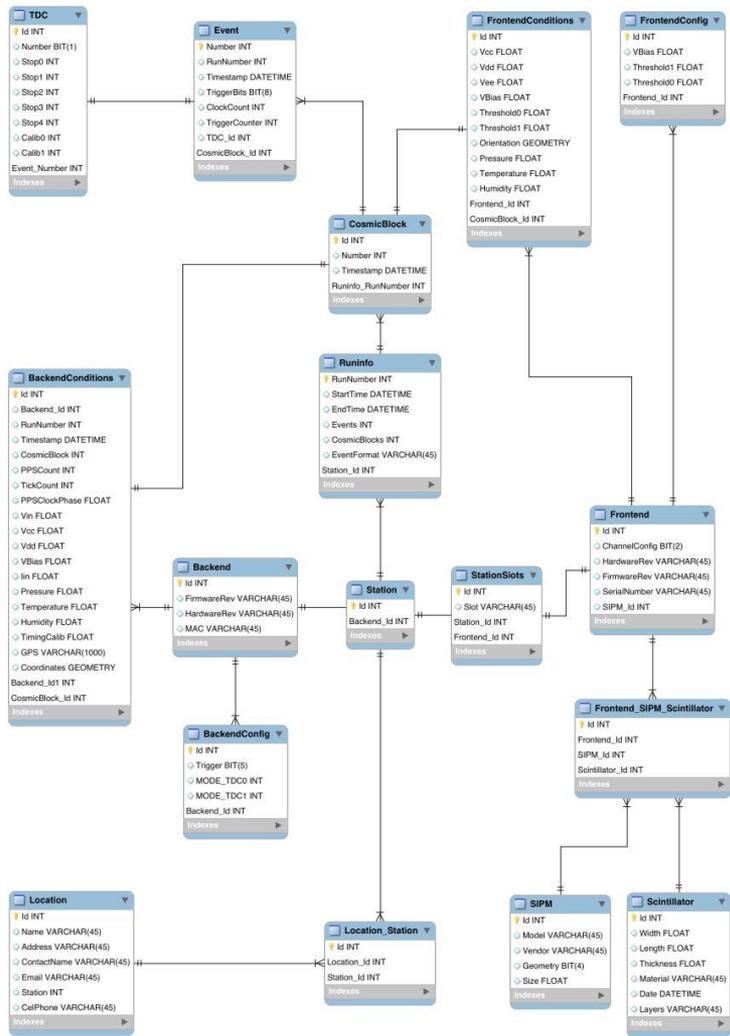
Frontend 2  
Já em desenvolvimento



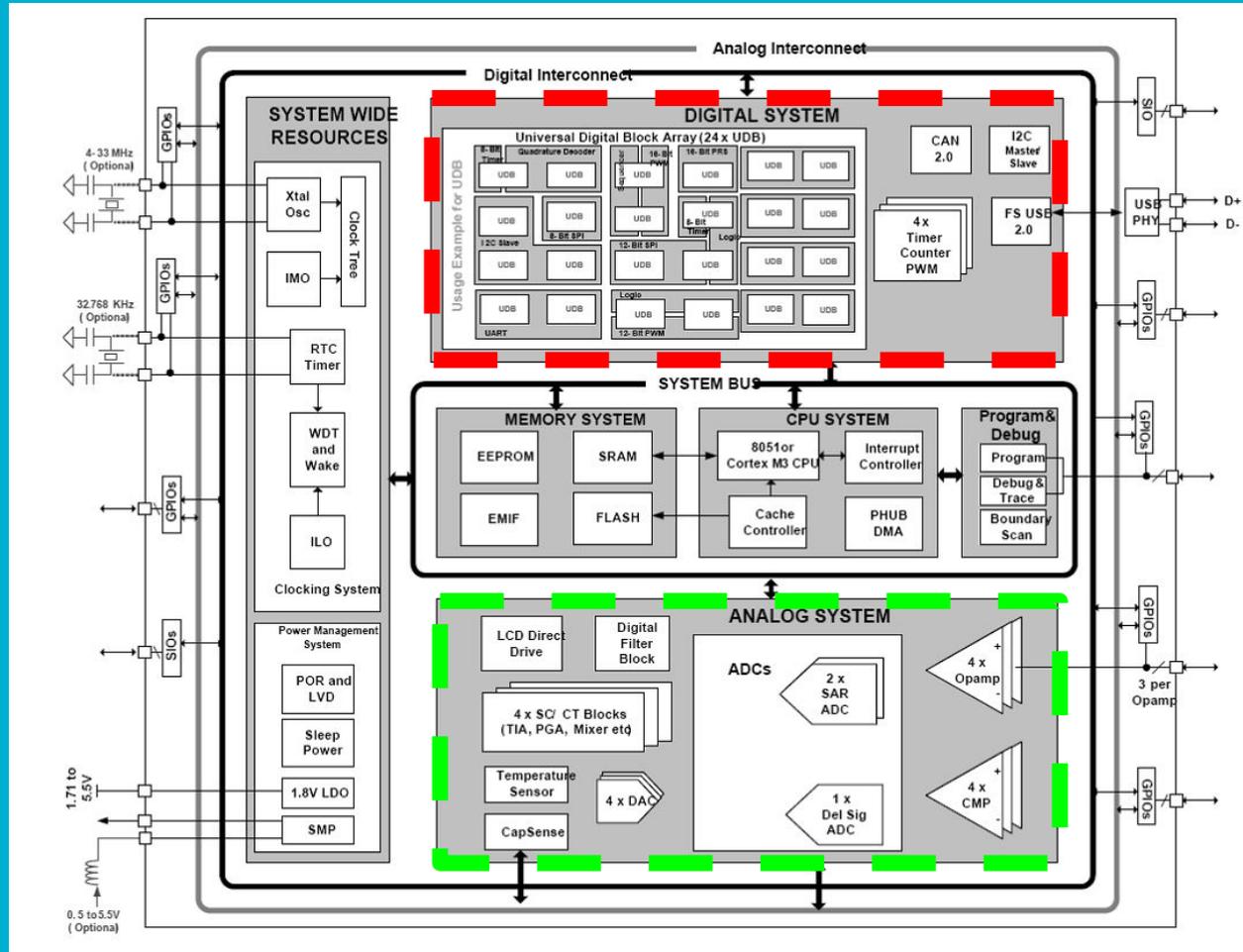
Backend



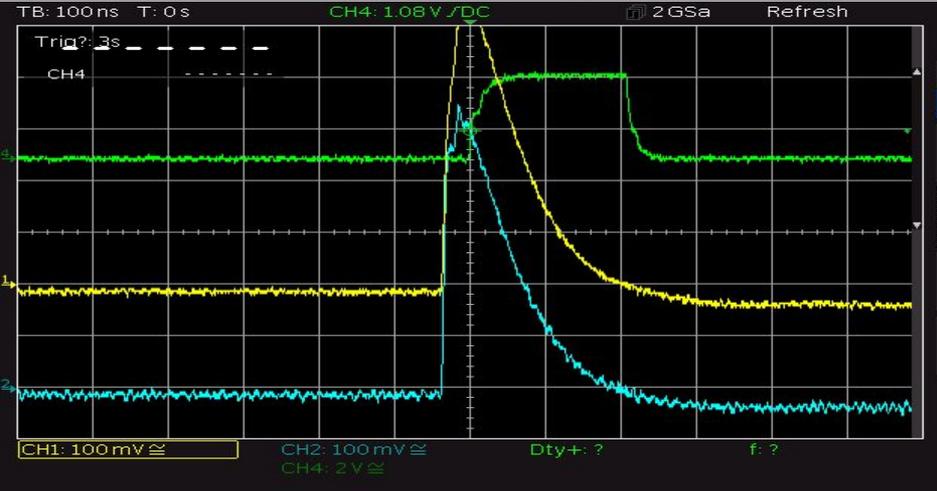
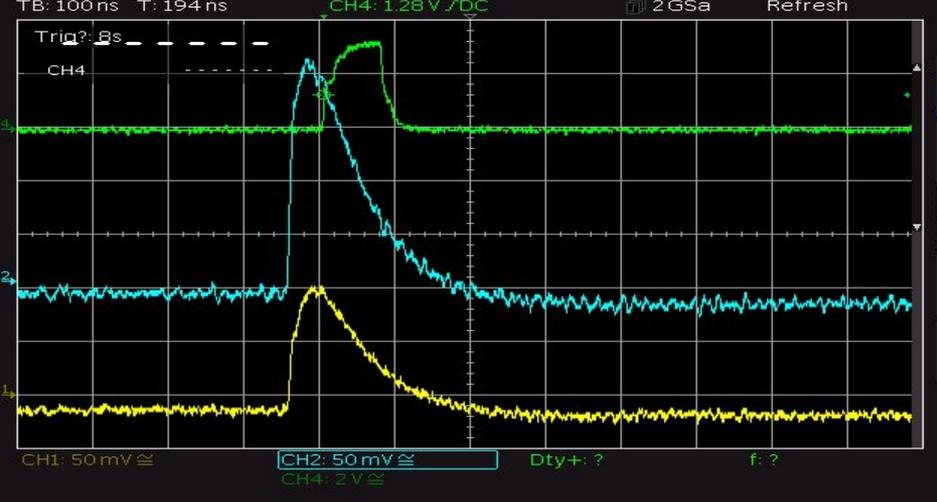
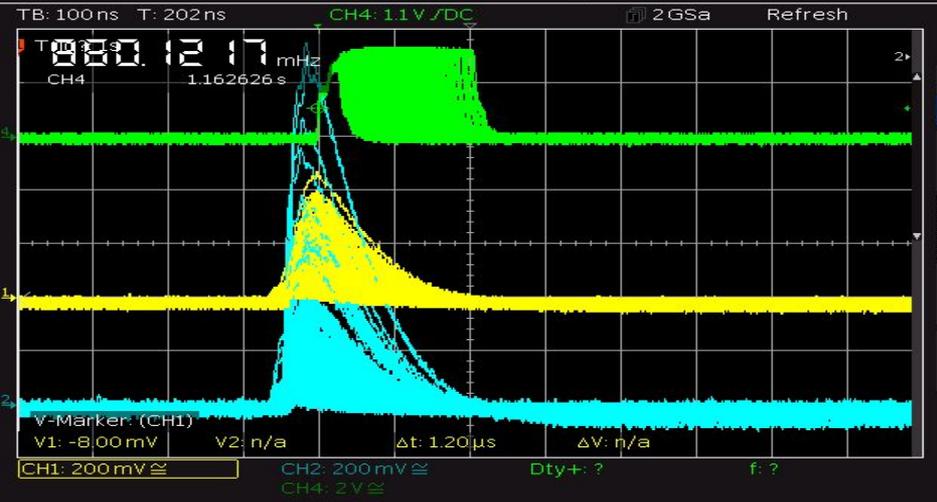
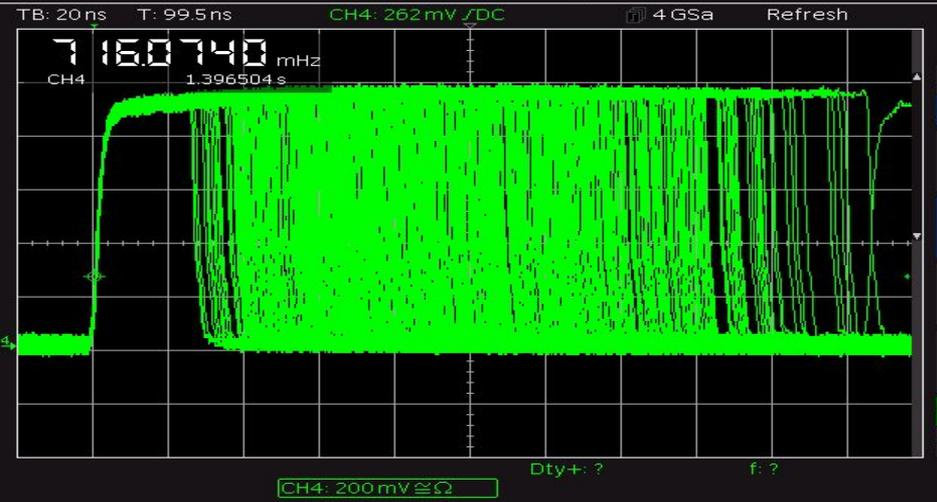
Cintilador



# Baseado em um Cypress PSoC 5L



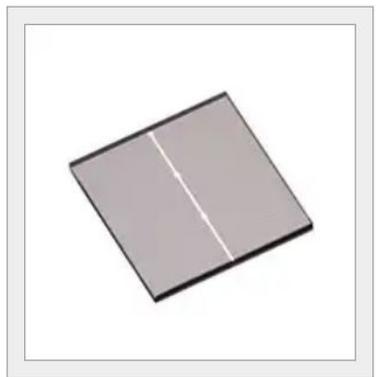






Product Index > Sensors, Transducers > Optical Sensors - Ambient Light, IR, UV Sensors > Broadcom Limited AFBR-S4N44C013

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Product Overview	
Digi-Key Part Number	516-4280-ND
Quantity Available	268 Can ship immediately
Manufacturer	<a href="#">Broadcom Limited</a>
Manufacturer Part Number	AFBR-S4N44C013
Description	SENSOR OPT 420NM UV
Manufacturer Standard Lead Time	12 Weeks
Detailed Description	Optical Sensor Ultraviolet (UV) 420nm

**Price & Procurement**

Quantity

516-4280-ND

Customer Reference

**Add to Cart**

All prices are in USD.

Price Break	Unit Price	Extended Price
1	26.41000	\$26.41
10	23.33500	\$233.35
100	17.80830	\$1,780.83
500	16.33452	\$8,167.26

Submit a [request for quotation](#) on quantities greater than those displayed.

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