

Raios Cósmicos nas Escolas

O Hardware e suas possibilidades

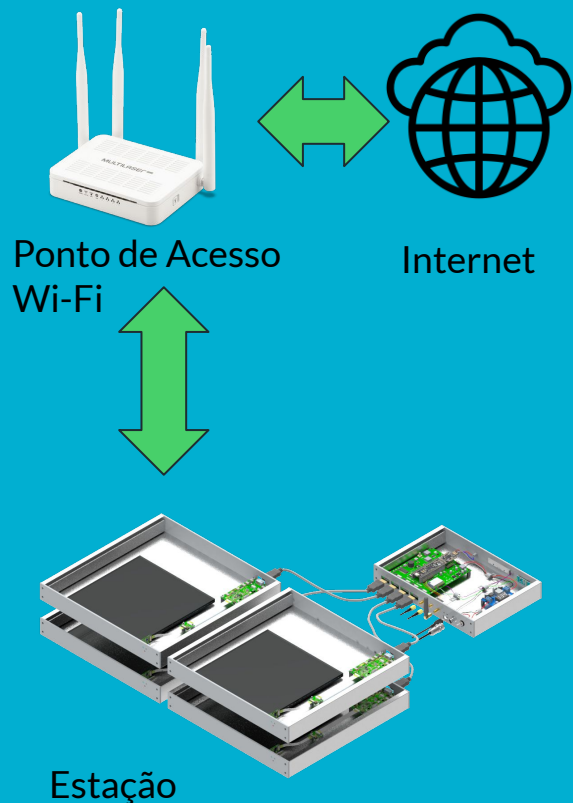
G. Saito, M. Leite, M. Kuriyama, R. de Paula, R. Menegasso

Instituto de Física da USP

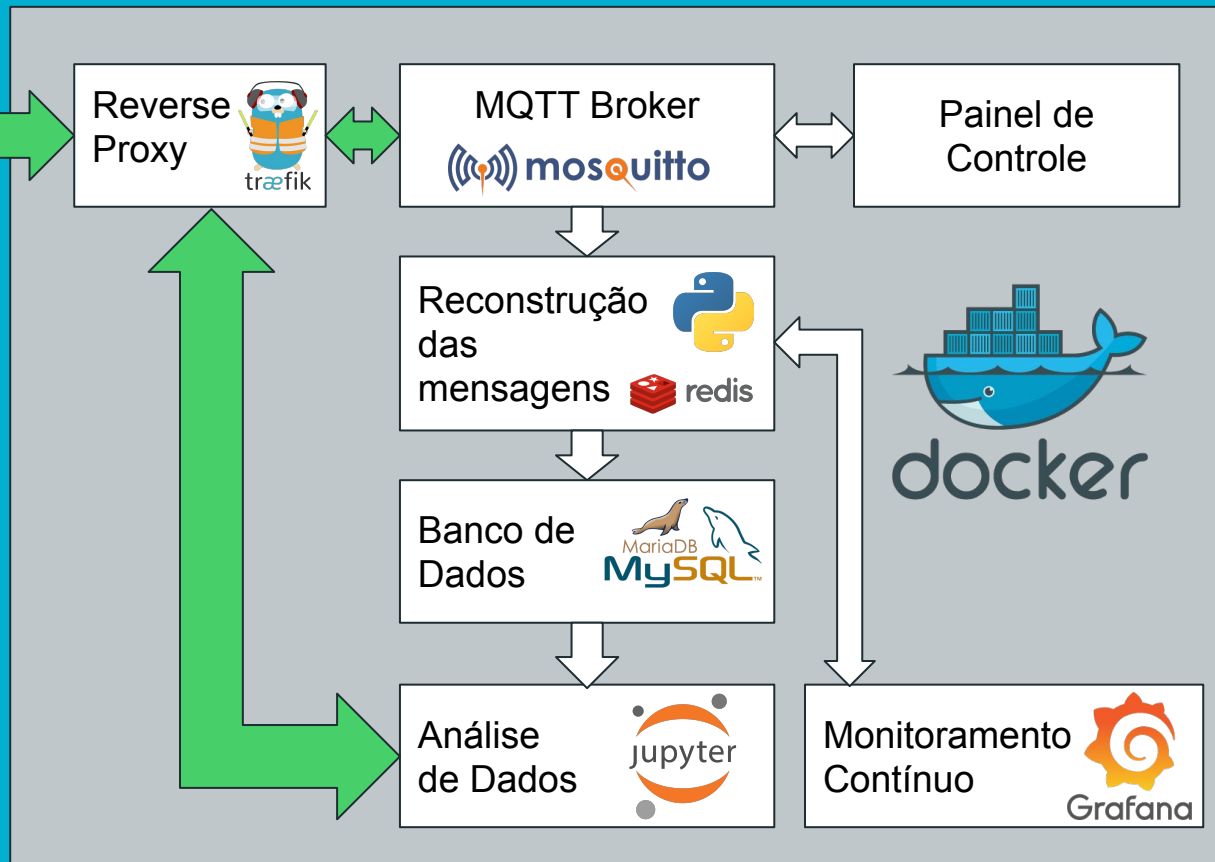


24 de Fevereiro de 2021

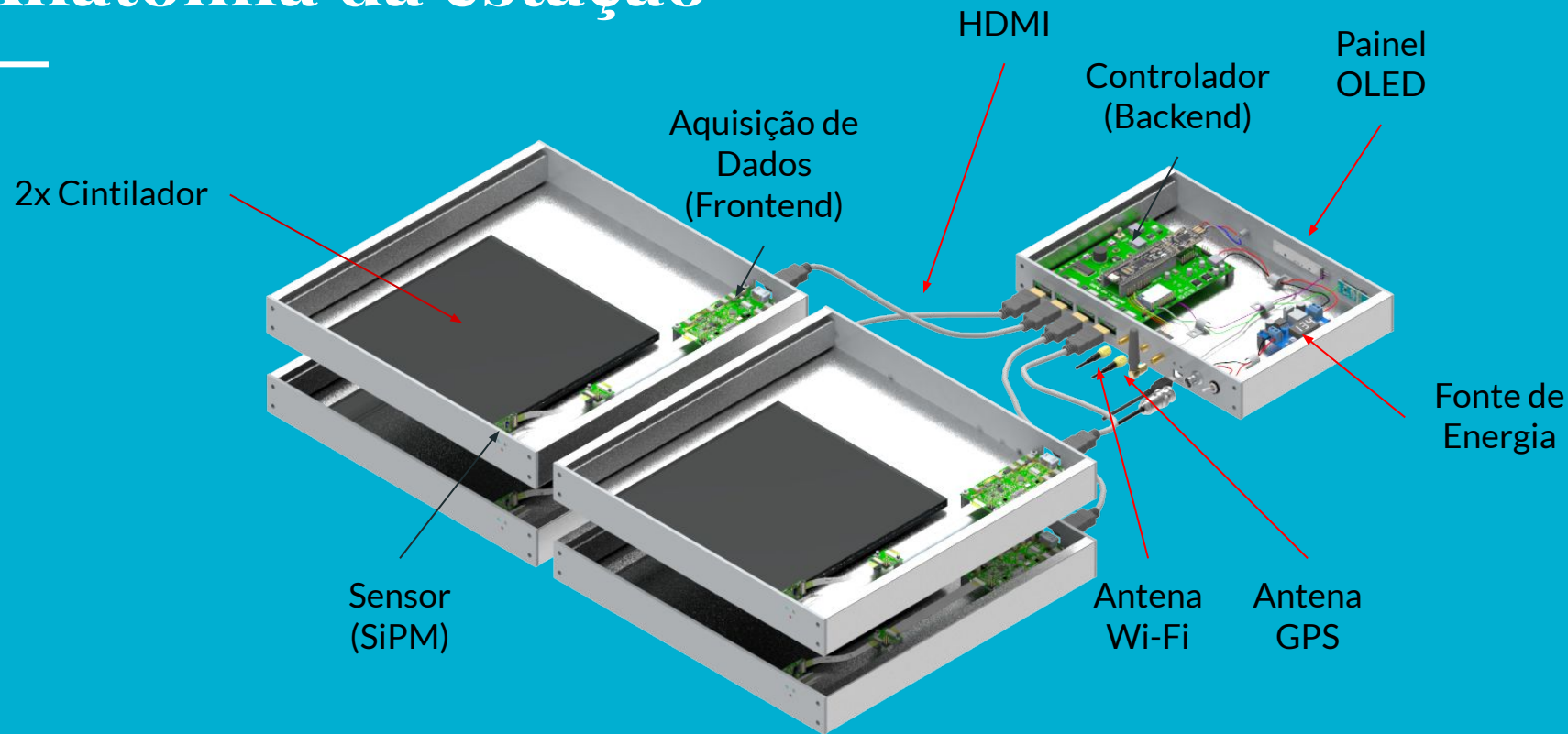
Hardware



Software



Anatomia da estação



Funcionamento

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



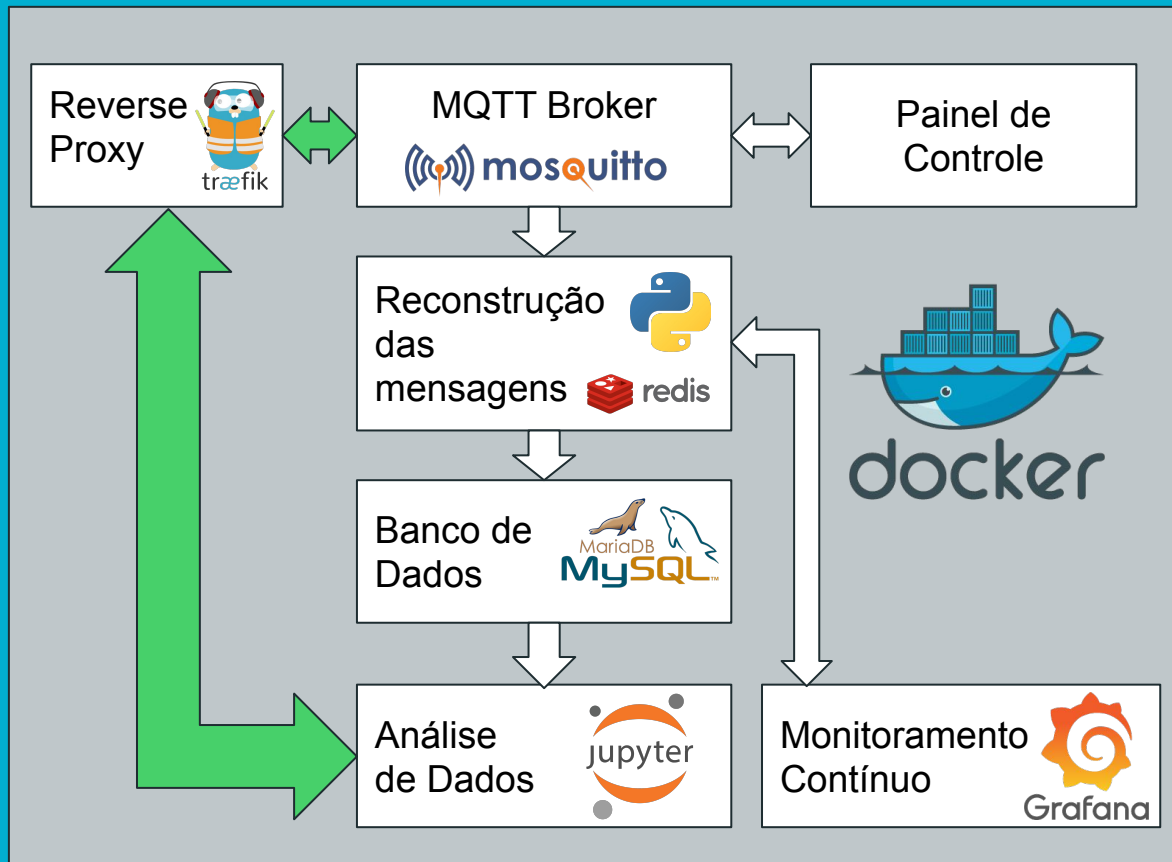
Software

Para rodar o software, tão simples quanto:

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

```
$ docker compose up
```

- Funciona em qualquer máquina Linux
- Configuração pronta

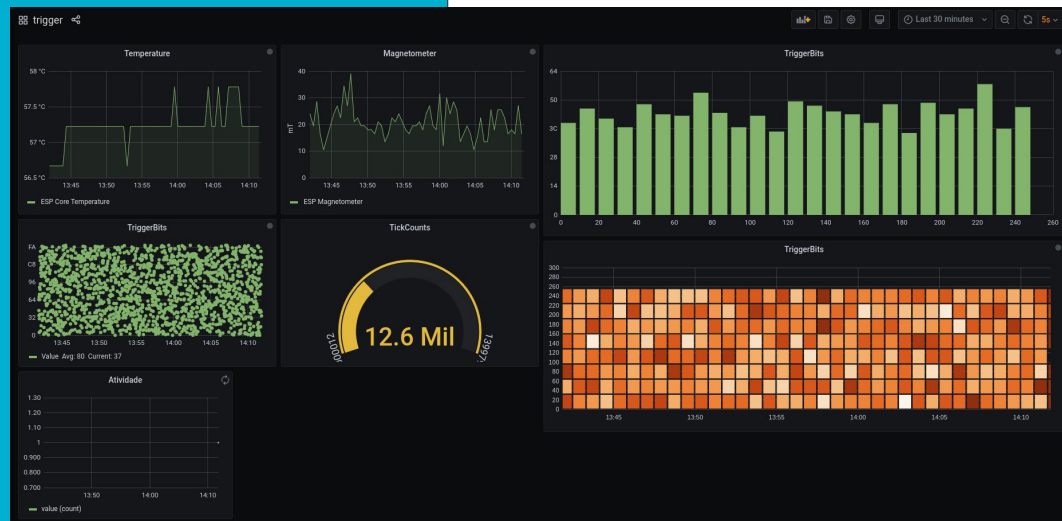
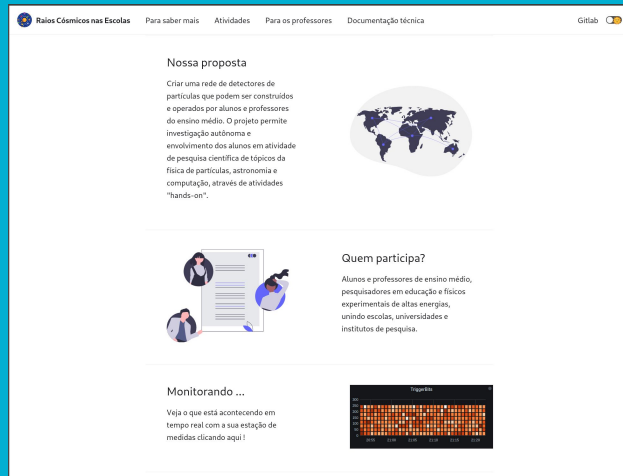


Grafana

Visualização em tempo real do sistema e das estações

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

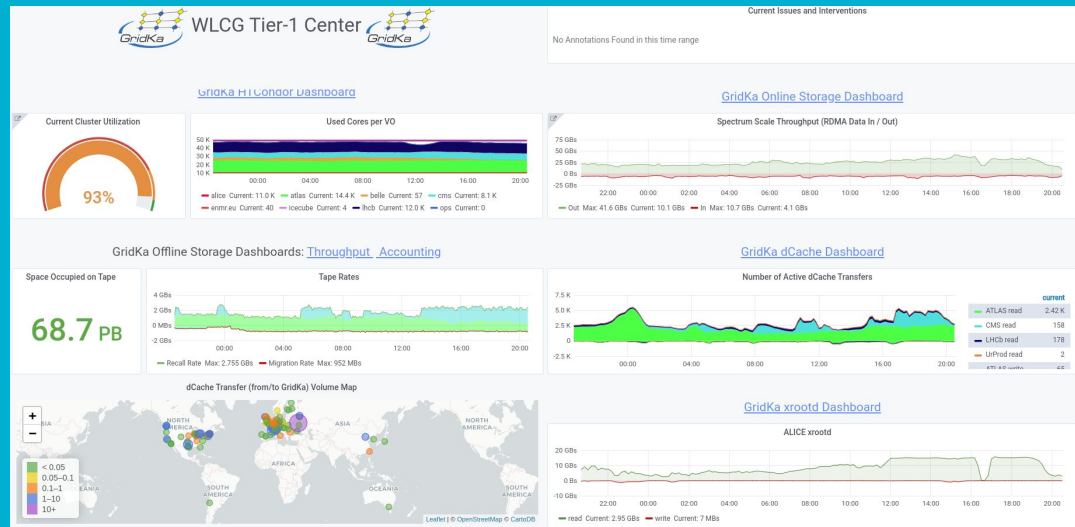
Acessível em raioscosmicos.if.usp.br/grafana



Possibilidades

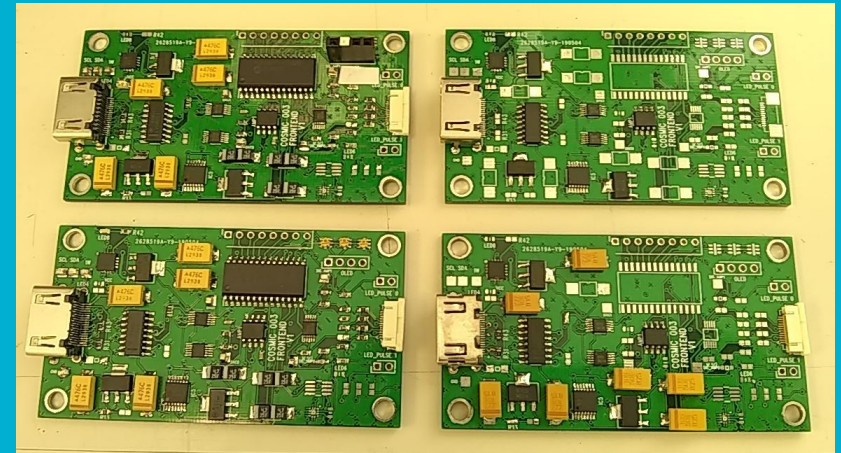
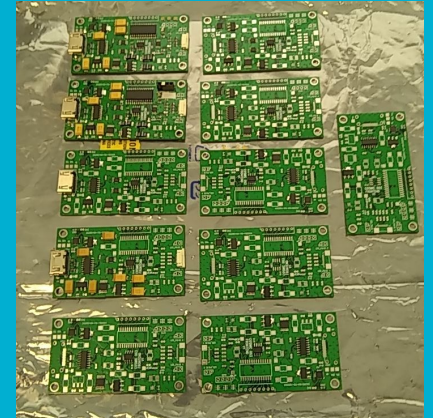
Muitas organizações usam Grafana

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

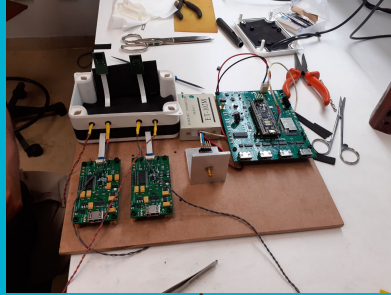


Status das estações

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



Evolução do Hardware



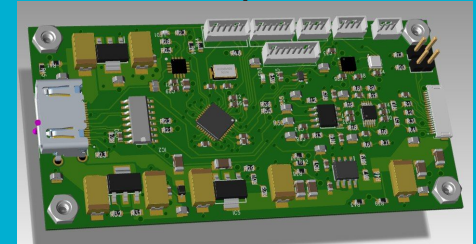
07/2018

06/2019

08/2019

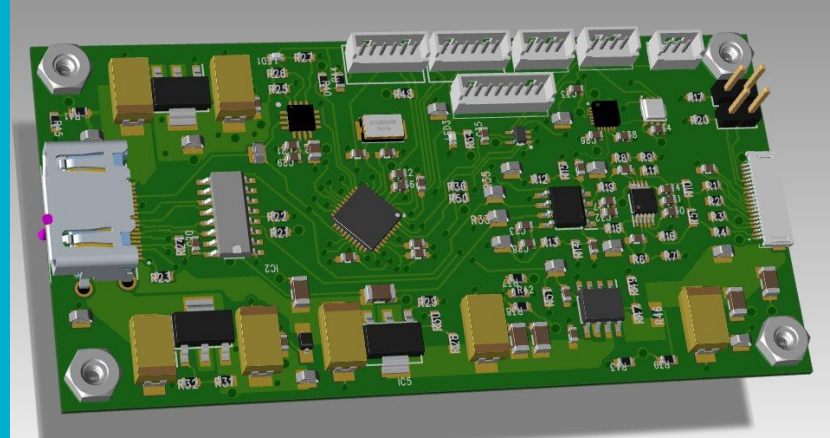
01/2020

02/2021



Nova versão do Hardware

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

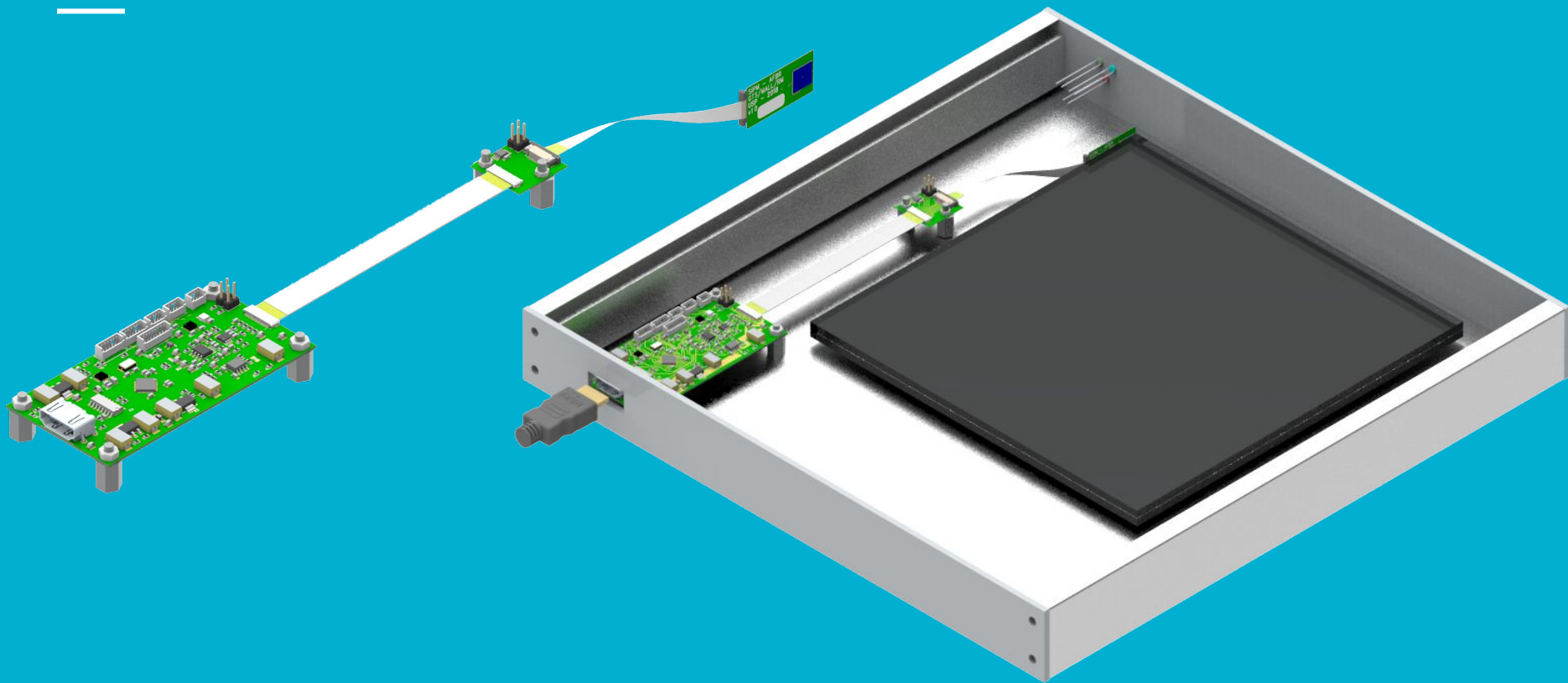


Feedback é sempre bem vindo

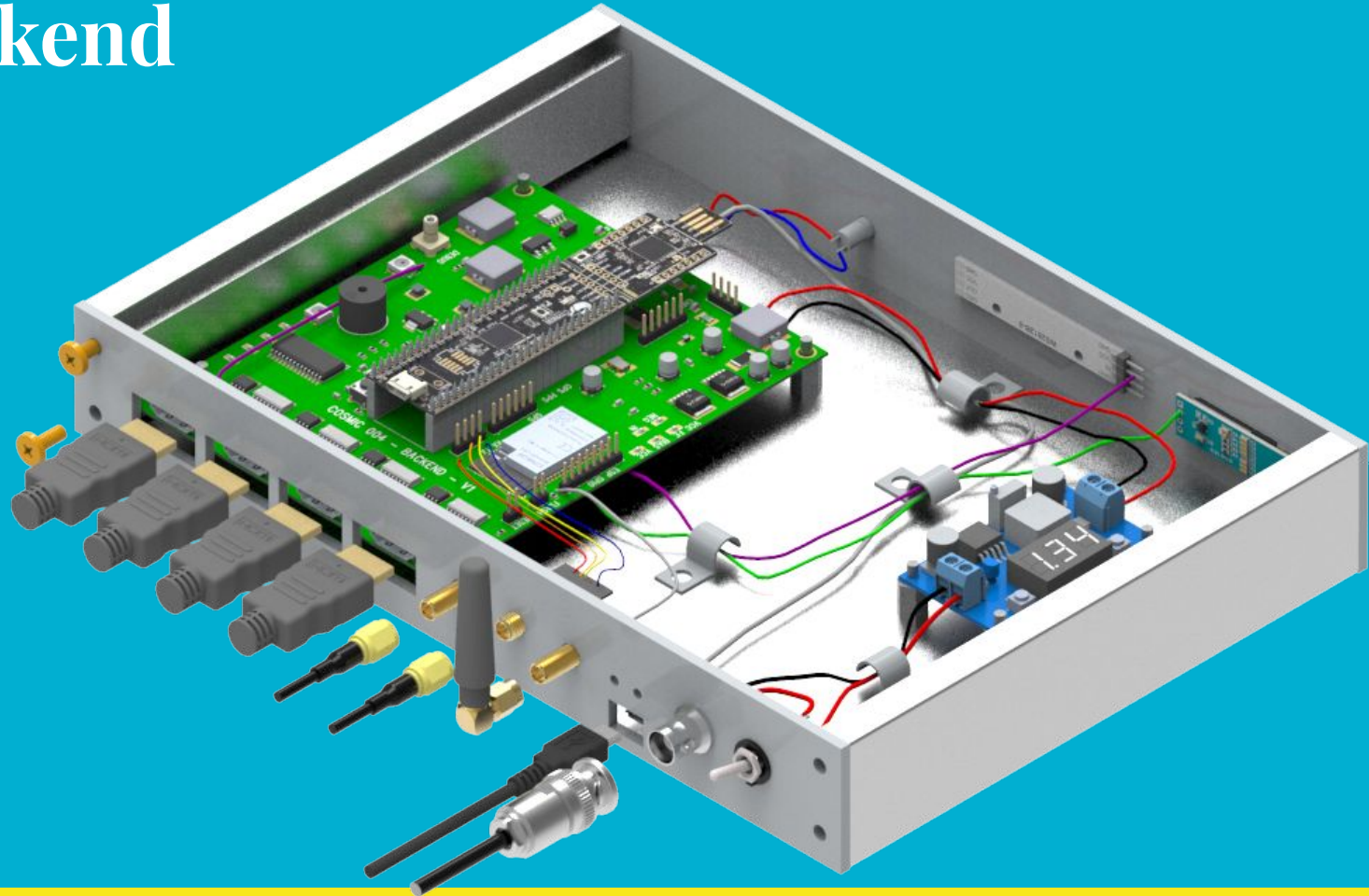
Obrigado!

Backup

Frontend + SiPM (Cintiliador)



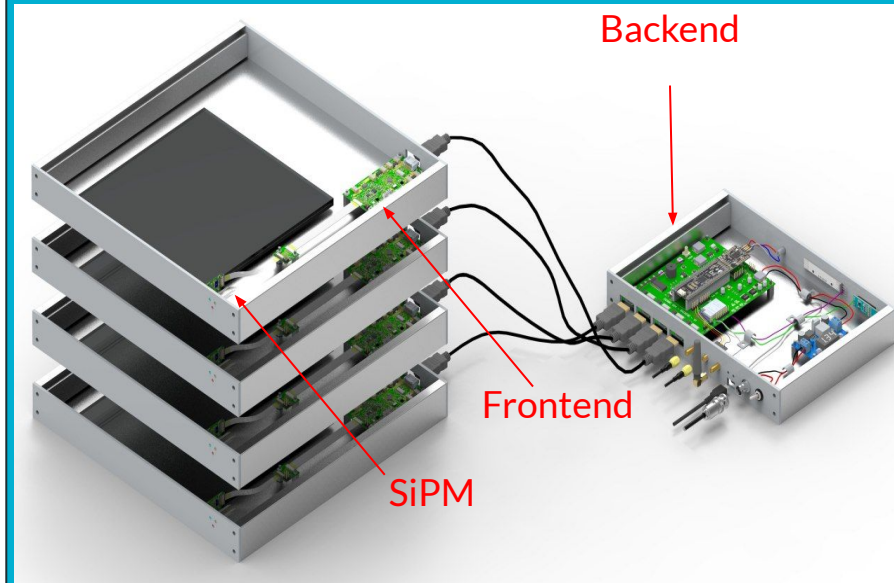
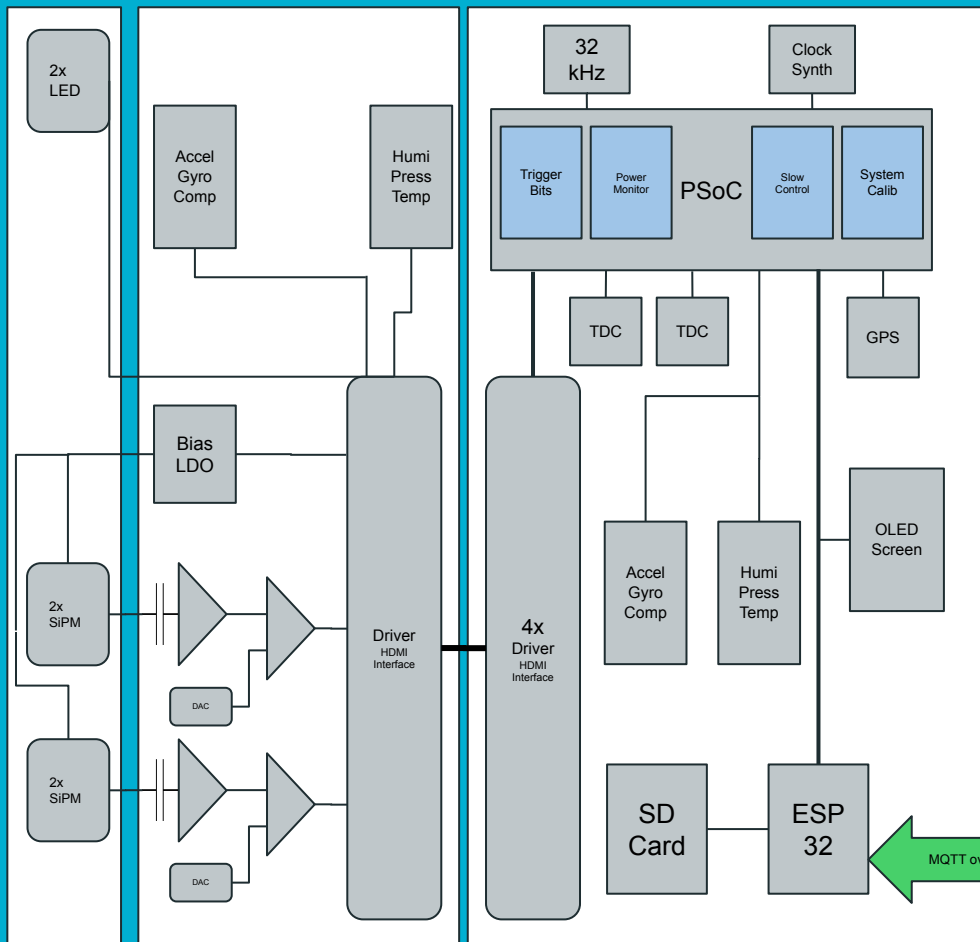
Backend



SiPM

1 a 4 Frontends

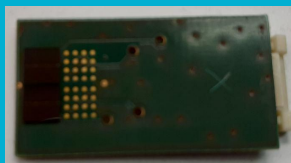
Backend



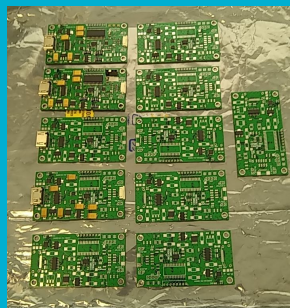
MQTT over Wi-Fi

Placas desenvolvidas

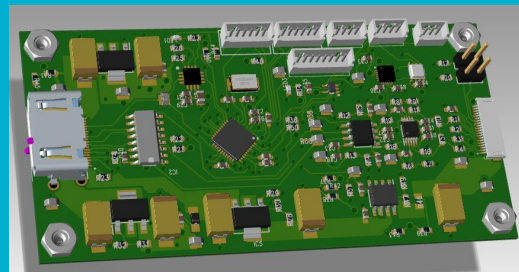
SiPM



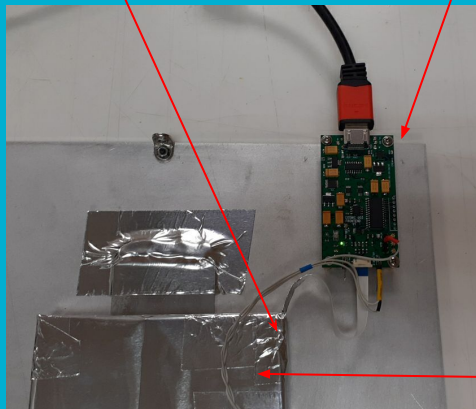
Frontend



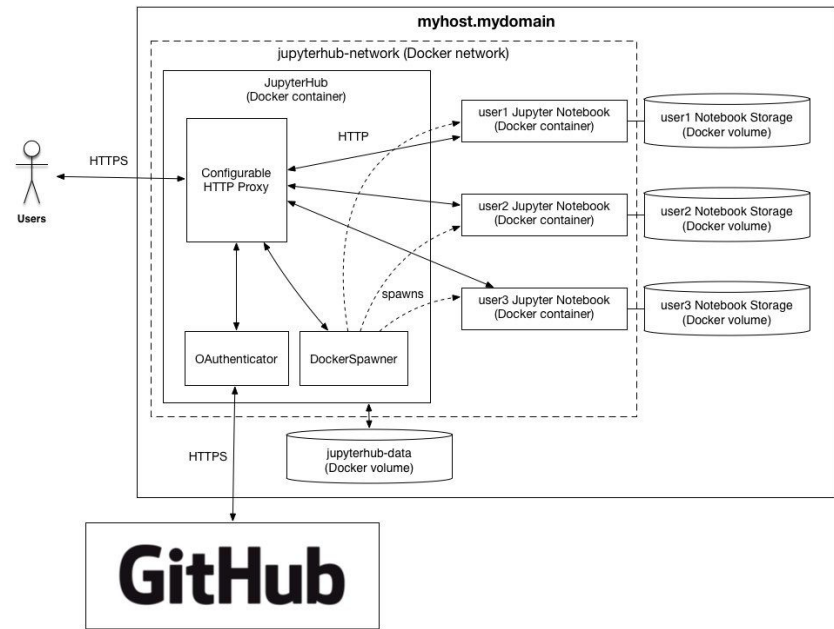
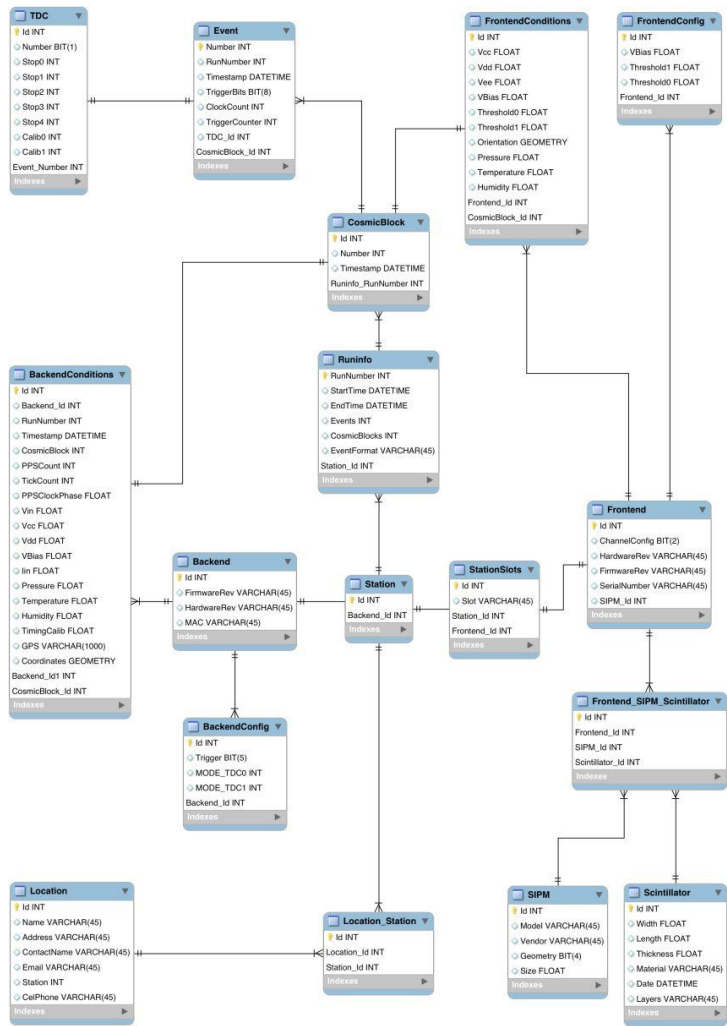
Frontend 2
Já em desenvolvimento



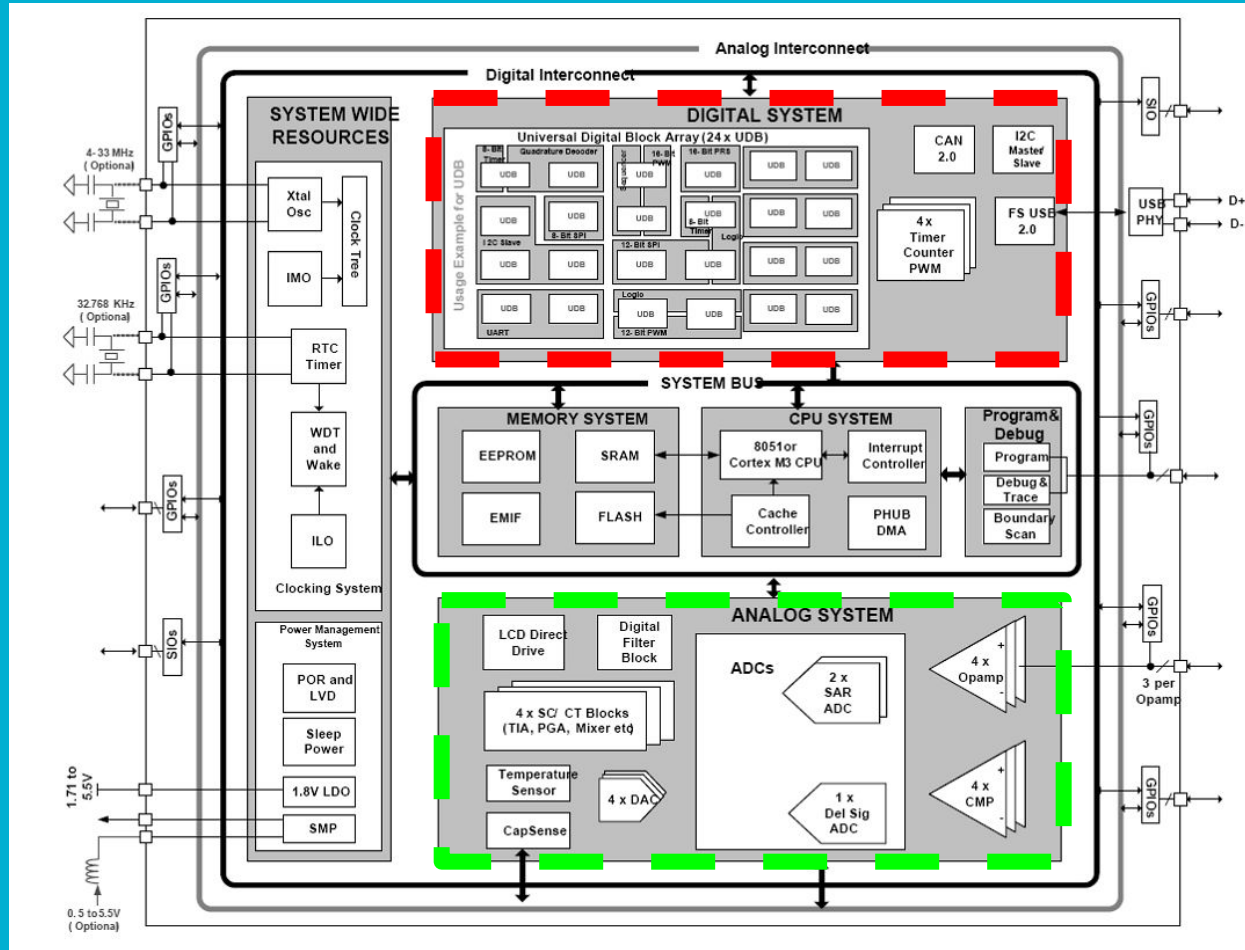
Backend



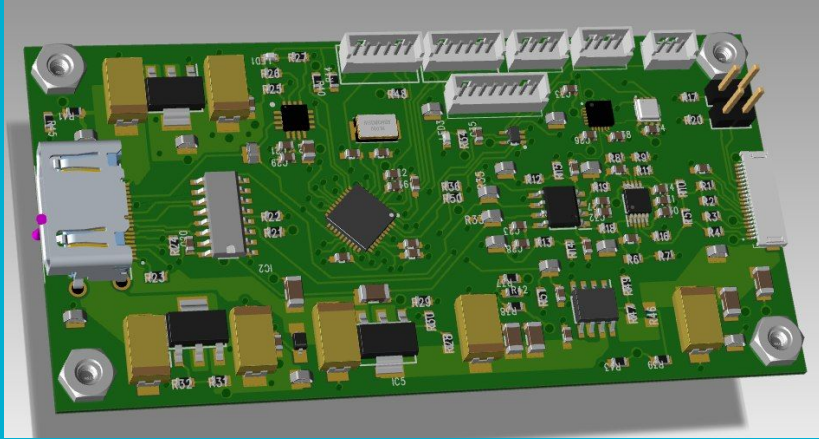
Cintilador

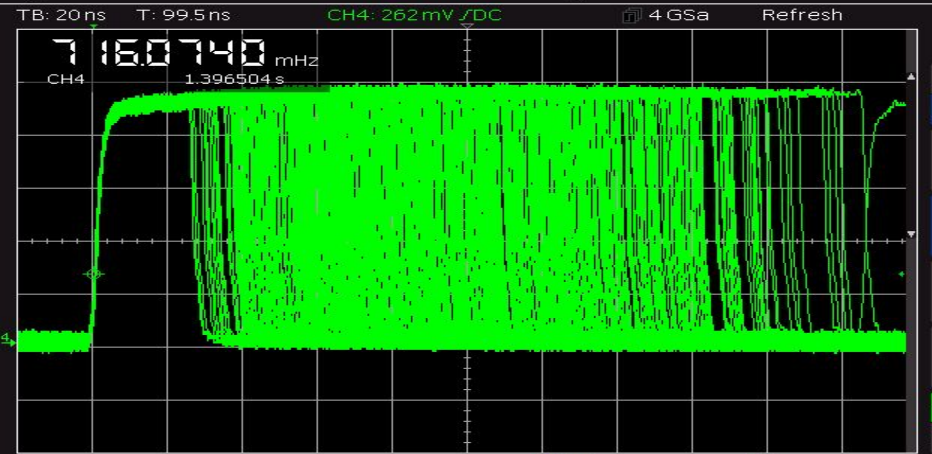


Baseado em um Cypress PSoC 5L



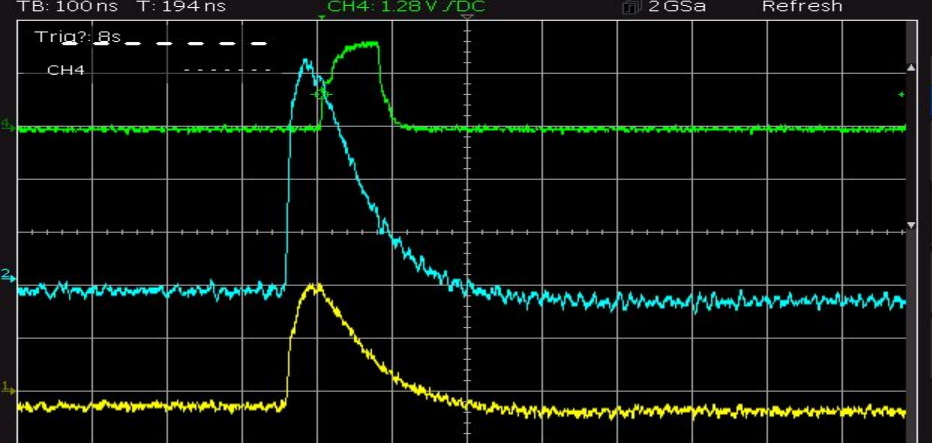
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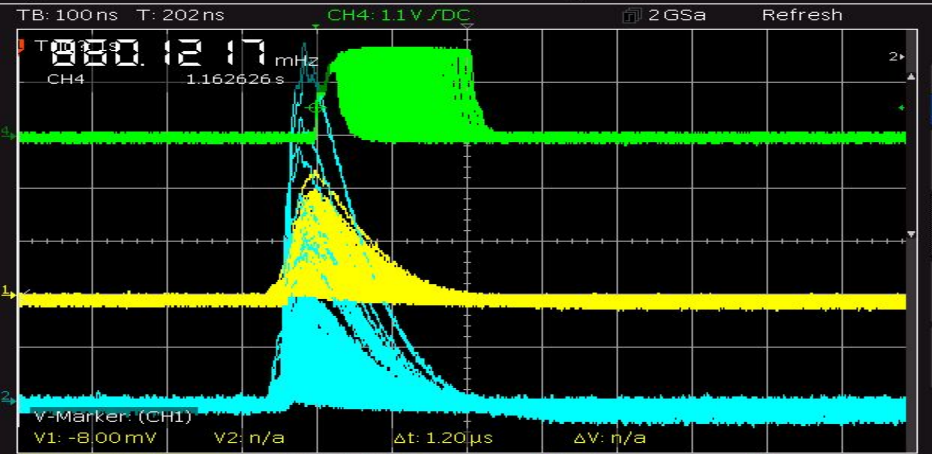
CH4: 200 mV \cong Ω

Dty+: ? f: ?



CH2: 50 mV \cong
CH4: 2 V \cong

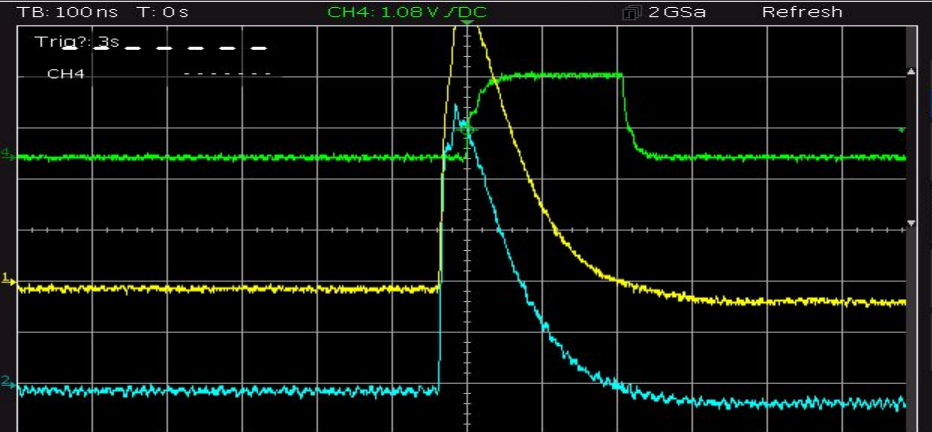
Dty+: ? f: ?



CH1: 200 mV \cong

CH2: 200 mV \cong
CH4: 2 V \cong

Dty+: ? f: ?



CH1: 100 mV \cong

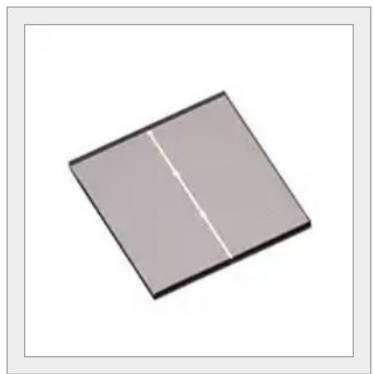
CH2: 100 mV \cong
CH4: 2 V \cong

Dty+: ? f: ?



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	Broadcom Limited
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.

Documents & Media	
Datasheets	AFBR-S4N44C013 Datasheet
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Online Catalog	AFBR-S4N44C013

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