



# Wireless battery monitoring device

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Wireless monitor

## Wi-Fi Enabled

- Voltages • Temperatures • Current & More



High speed data transfer

## CAN-BUS

- In-sync with battery pack B.M.S for real-time data transfer.



Online View

## Dashboard

- Online customizable dashboard accessible from anywhere.



**Wireless** battery  
**monitoring** device.

**pCloud.**



# CONTENTS



## 01 Introduction

**01** Brief introduction into what **pCloud** is and what it wants to achieve.



## 02 Architecture

**02** The data transportation architecture is designed to distribute workload across multiple nodes without a single point of failure.



## 03 Design

**03** Sneak peek of the **pCloud**. Preview our out of the box solution for your battery pack.



## 04 Dashboard

**04** Online dashboard that provides 24/7 instant data, charts of recent history, and diagnostic information.

# 01. INTRODUCTION.

## #01 ABOUT

// What is pCloud ?

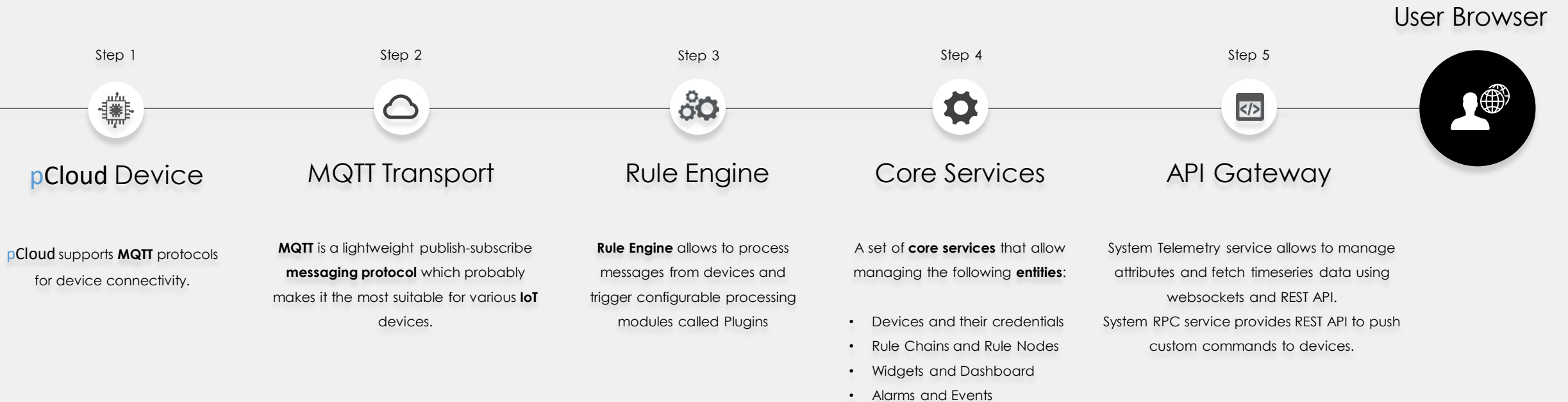
pCloud is an internet based remote system that allows **online** monitoring of **battery packs** through a web browser, smartphone, or tablet.

## #02 ABOUT

// How does pCloud work?

pCloud device works with a **Wi-Fi** connection. This allows end users to **remotely** monitor battery pack performance data from BMS in **real time**, as well as display **fault codes** and generate **E-mail alerts** when certain events occur.

## 02. ARCHITECTURE.



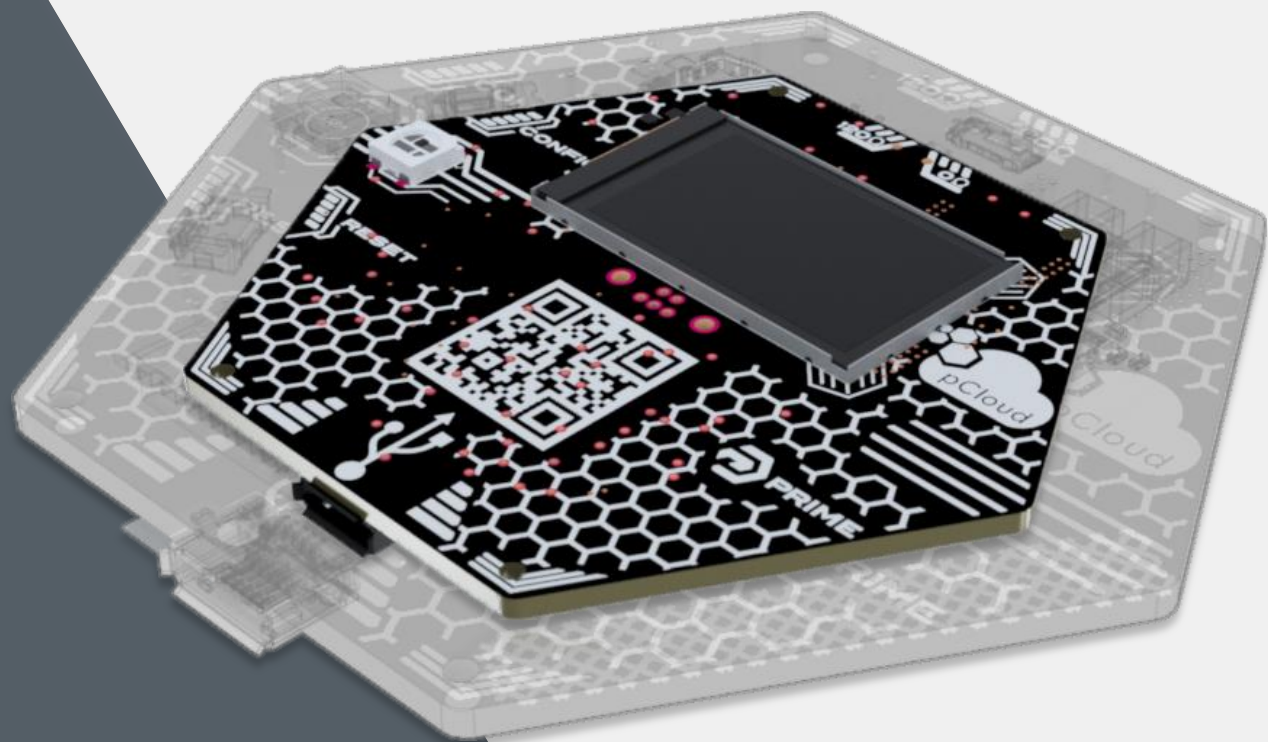
## 03. DESIGN.

Stay connected  
to your battery  
pack from  
anywhere

pCloud comes with a simple, futuristic design, providing  
out of the box solution for remote monitoring.

pCloud.

Front View



Wi-Fi Enabled



CAN-BUS



Online Dashboard



E-mail Alerts



Front View

## Wide viewing angle Display

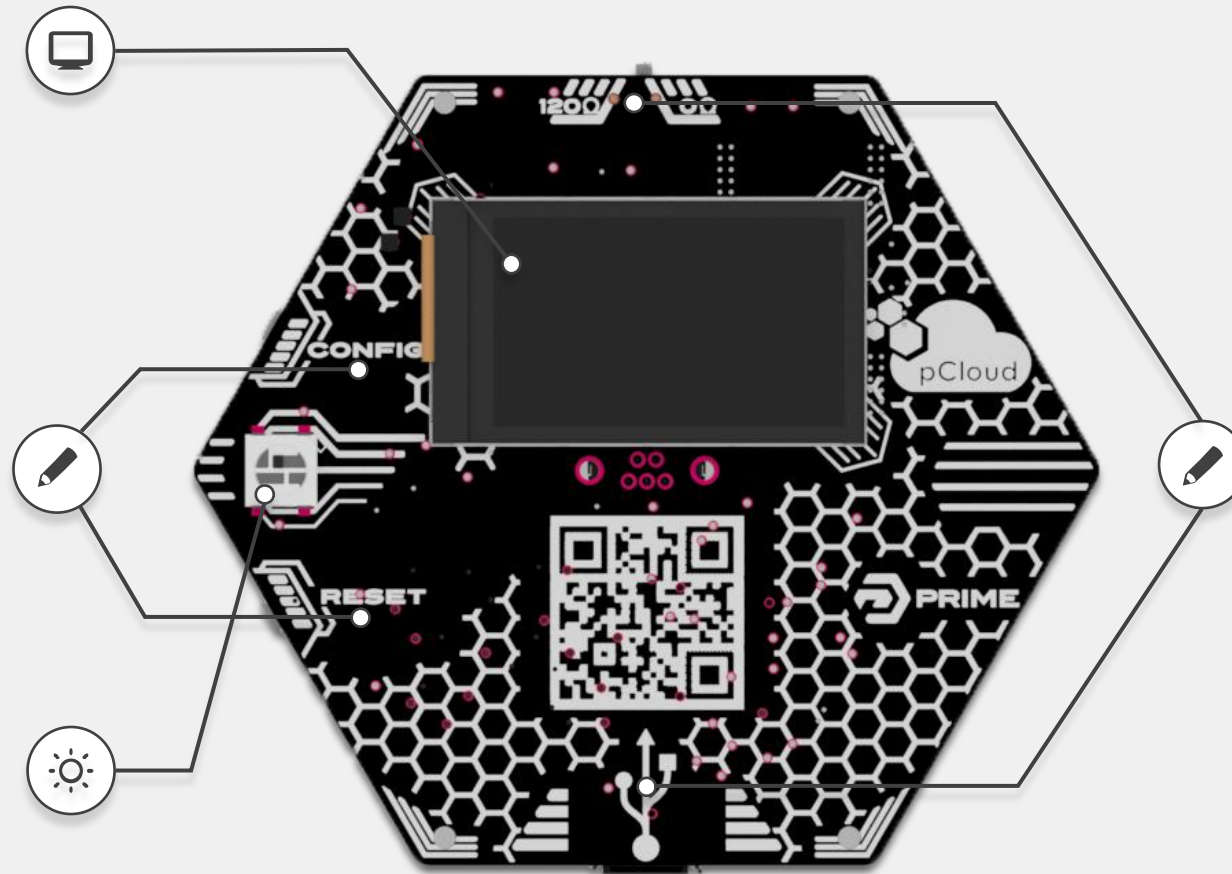
1.14 inch TFT LCD Display IPS 135x240mm. Shows real time indicator of battery's SoC and Wi-Fi Signal as well as providing system information about the device and battery pack.

## Graphic Indicators

Silkscreen graphics for indicating button and port placement.

## Status LED

Serves as an indicator of the current device status. Also useful for debugging purposes.

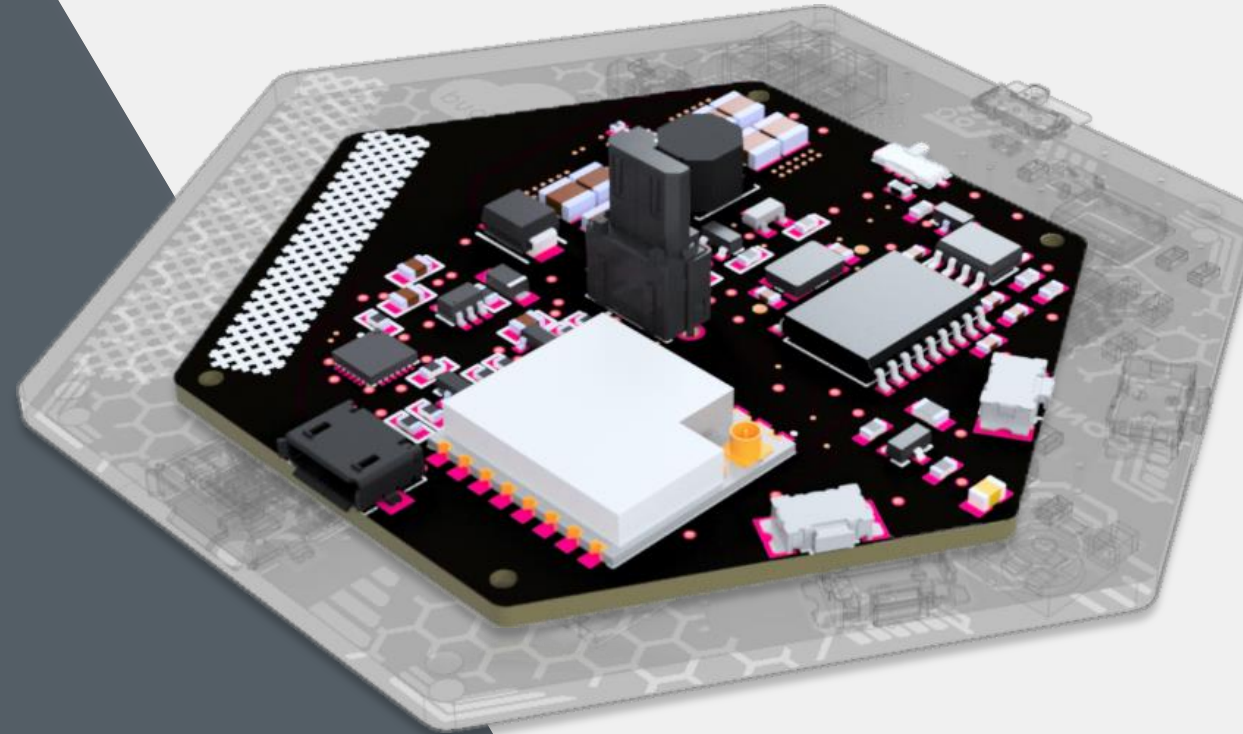


## Graphic Indicators

Silkscreen graphics for indicating button and port placement.



Back View



ESP8266  
μController



μUSB Panel Mount  
Connector



“Hidden” Action  
Buttons



2.4GHz – 5.8GHz  
Antenna



## 03. DESIGN.

Based on high –  
speed ESP8266  
microcontroller

pCloud uses the highly capable ESP8266 paired with the MCP2515 CAN BUS Controller can work at speeds up to 1Mbps while providing a stable solution for uploading telemetry data.

pCloud.



Back View

## CAN-BUS Resistor Switch

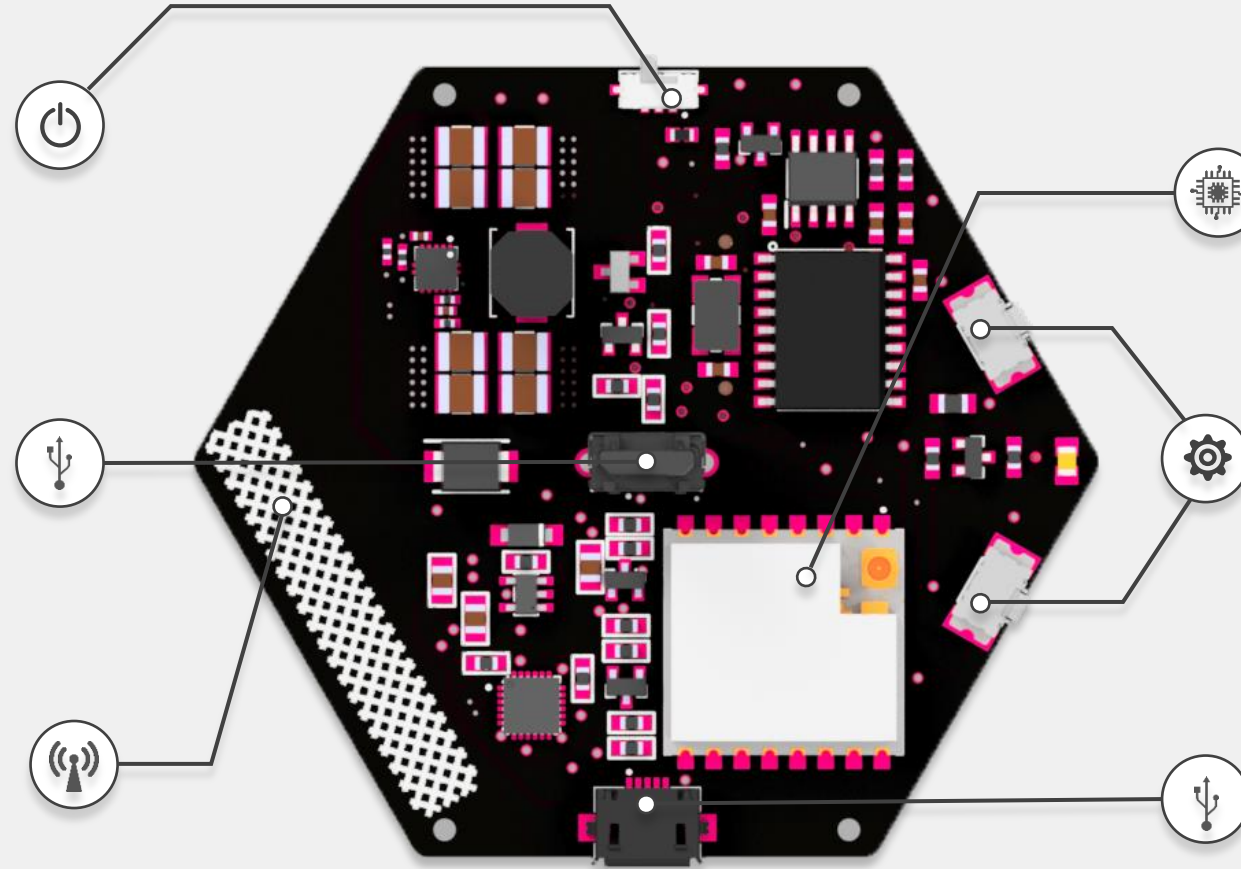
Slide switch for turning on/off the 120Ω resistor.

## Micro-USB type B

Designed for panel mounting on the battery pack's case. Serves as power supply as well as providing data exchange between **pCloud** and the BMS

## FPC Antenna

Dual-Frequency antenna (2.4GHz – 5.8GHz).  
Antenna Gain: 3dbi



## ESP8266 Microcontroller

Wi-Fi enabled microcontroller clocked at 80 MHz and 3.3V logic.

## Reset & Config Buttons

Silkscreen graphics for indicating button and port placement.

## Micro-USB type AB

Enables access to serial monitor and can be used for Firmware updates.

Front View

01

## Wide Angle Display

Shows real time graphic indicator of battery's SoC as well as Wi-Fi signal strength and guiding information in different modes.

02 & 03

## Reset & Config Buttons

Silkscreen graphics for indicating button and port placement.

04

## Status LED

Serves as an indicator of the current device status. Also useful for debugging purposes.

05

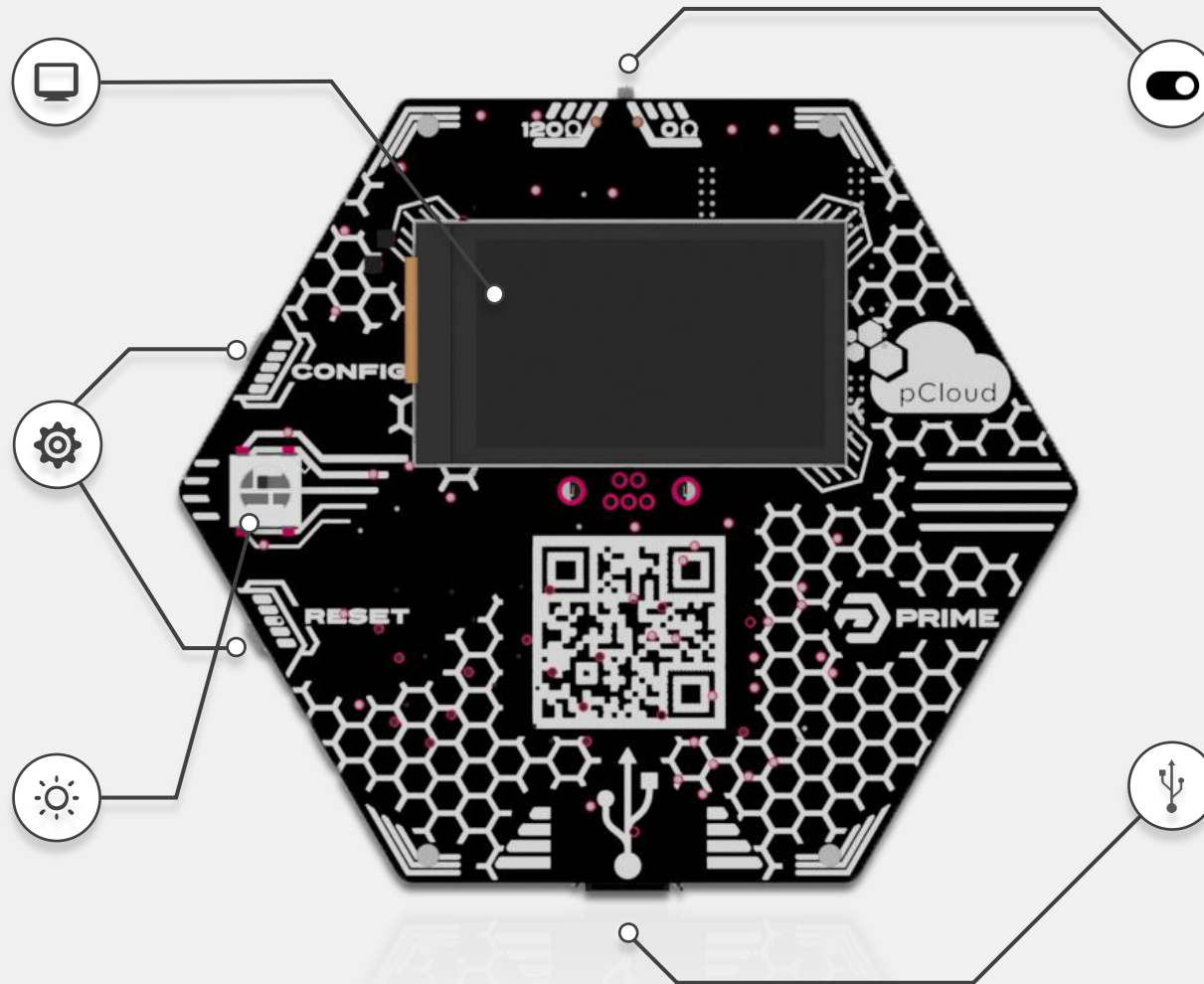
## Slide Switch

Slide switch for turning on or off the 120Ω resistor.

06

## Micro-USB type AB

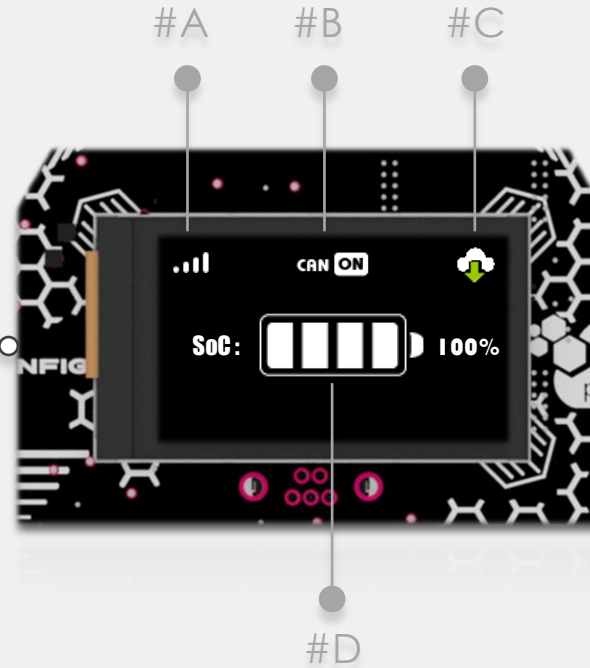
Enables access to serial monitor and can be used for Firmware updates.



01

## Wide Angle Display

**Real time** graphic indicator of battery's **SoC** as well as Wi-Fi **signal strength** and guiding information in different modes.



## Signal Strength

Wi-Fi signal strength indicator received from the FPC antenna.

#B

## CAN On/Off

The device constantly checks for CAN-BUS messages and reports whether or not there is any activity on the bus.

#C

## Update Notification

Wi-Fi signal strength indicator received from the FPC antenna.

#D

## State of Charge Monitor

Wi-Fi signal strength indicator received from the FPC antenna.

## Config Portal

### 02 Config Side Button



Provides **two** distinct functionalities:

**#A. Config Portal** – Hold for 5 seconds to go into Config Mode

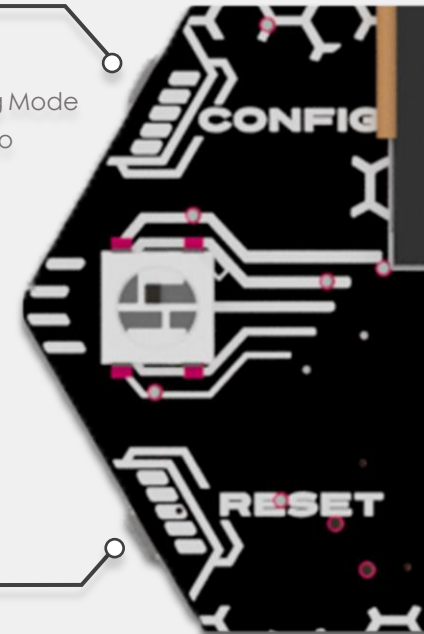
**#B. Firmware Update** – Double tap on the side button to perform a firmware update if there is one available.



### 03 Reset Side Button



Single press on the reset button will give a quick reset to the device.



- Once you enter **Config Mode**, the device will become an **Access Point**.
- **Connect** to the Access Point using either your **mobile device** or **PC** and you will be redirected to a private Web Page.
- If you are not redirected after a few seconds, open a browser and type in the following IP:  
**<http://192.168.4.1/>**
- On the Web Page you will be able to insert:
  - ▶ **SSID** : The name of the Wi-Fi that is within range of the device. This will provide internet connection to upload telemetry data.
  - ▶ **Password** : Wi-Fi network security key.
  - ▶ **Server IP** : Provided with the device.
  - ▶ **Private Token** : provided with the device. Please do not share with anyone your private token.
- After inserting all information click on **SAVE** and wait a few seconds for your device to finish the configuration.
- The Web Page also provides useful information about the device and a help menu.

## Firmware Update

- Performs over the air Firmware Update if there is a new version available



## 04 Status LED

Serves as an indicator of the current device status. The LED will display certain colors depending on it's current state:

- #A. Constant RED
- #B. Constant GREEN
- #C. Color Cycle.



#A

### Constant RED

The RED color indicates that the device lost connectivity and is trying to reconnect to the Wi-Fi. If this problem persists the signal strength might not be strong enough to maintain good connection.

#B

### Constant GREEN

The device is into Config Mode and is waiting for you to finish the configuration process.

#C

### Color Cycle

While the device is monitoring the Battery Pack, it the LED will smoothly cycle through all colors.

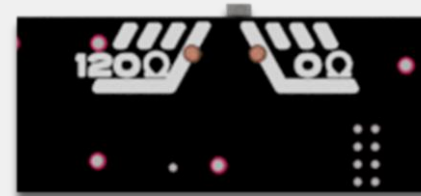
## 05 Slide Switch



The CAN-BUS requires termination resistors on a cable that should match the nominal impedance of the cable.

Therefore in some cases the BMS requires a **120Ω** resistor on the other end of the bus in order for the communication to work.

Sliding the switch turns on / off the resistor on the data lines.



#A

## Micro-USB type B Female

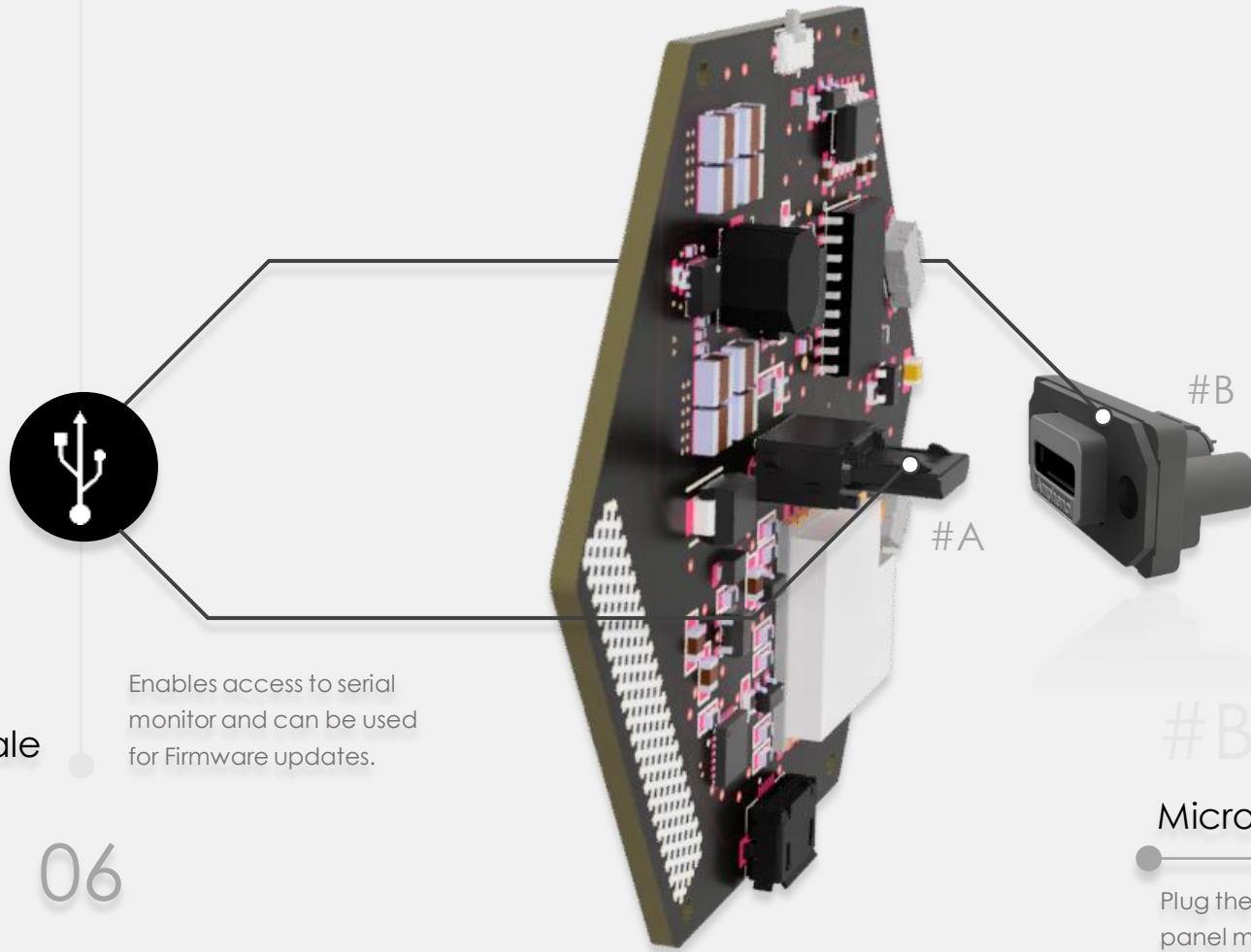
Small Micro-USB Panel connector that can be found on the Battery case. The relatively small dimensions make it subtle and elegant without influencing the pack's overall design

#B

#B

## Micro-USB type B Male

Plug the device into the Battery Pack's panel mating connector. Serves as power supply as well as providing data exchange between **pCloud** and the BMS



Enables access to serial monitor and can be used for Firmware updates.

Micro-USB type B Female/Male

06

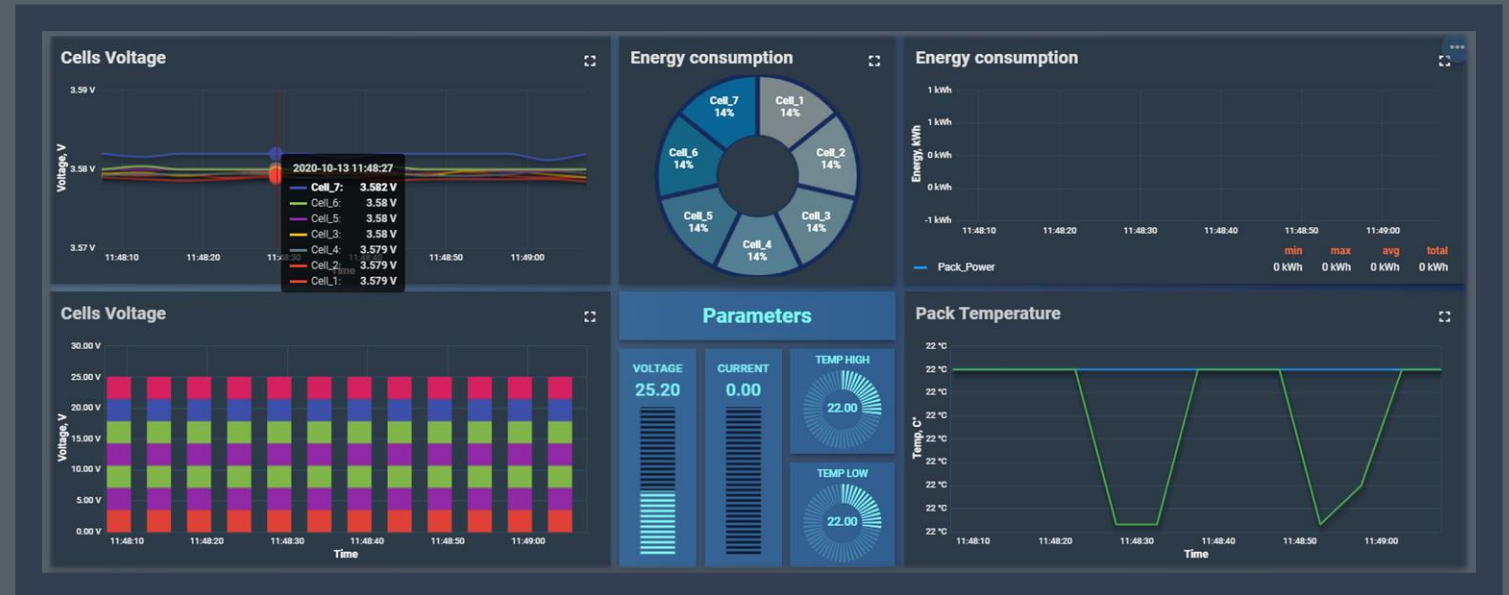


Unlimited chart combinations

## 04. Dashboard.

Custom **rich**  
Dashboards for  
data visualization

- Data visualization and remote device control in real-time.
- Deliver and store data from smart meters in a reliable way.
- Visualize real-time historical on customizable dashboards.
- Generate E-mail alerts when certain events occur.



pCloud provides instant data, charts of recent history, and diagnostic information including recent events