DO IT YOURSELF FREE PROJECT

WiFi SmartBMS DATA EXTRACTOR

&

REMOTE COLOR DISPLAY

for

JK / DALY / CLONEs

Version 3.6.4 "*The SmartBMS dongle Bible*" released on 25-Oct-2026

FOLLOW this Manual to build / setup & configure

Wi-Fi Smart BMS Data Extractor

for **JK-PBx** , **JK-Bx** , **DALY** and CLONES eg **Hi / 100Balance** etc.

AND

Wi-Fi Remote Colour Display

MQTT or MODBUS based on TASMOTA or OPENHASP projects

No Rocket scientist needed
Bill of Material is about 10$ - time to build is about 20-30minutes
NO Hidden costs
NO Subscription Required
Your Data stays Yours
Work with or without Internet

Feel free to get in touch with me Paolo @ -> info@dalybmswifi.com

DISCORD channel
or web **FORUM**

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***** DISCLAIMER *****

SmartBMS Data Extractor and ***Remote Color Display*** are ScanLabs DIY (Do It Yourself) projects provided freely and without any guarantees. The creators and maintainers are not responsible for any issues, damage, or consequences that may arise from building or using these projects. Use them entirely at your own risk.

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Smart BMS DATA EXTRACTOR
JK or DALY / CLONEs

FOLLOW the instruction to build a Wi-Fi BMS Data Extractor for
JK-PBx , **JK-Bx** or **DALY** (and CLONES – Hi / 100Balance etc.)

Your target on the On the Image!
(image refers to Daly BMS connector)

In the next section we will refer to ***the ScanLabs Smart BMS data Extractor*** as ***SSBdE*** , ***the dongle***, ***the accessory*** etc ..

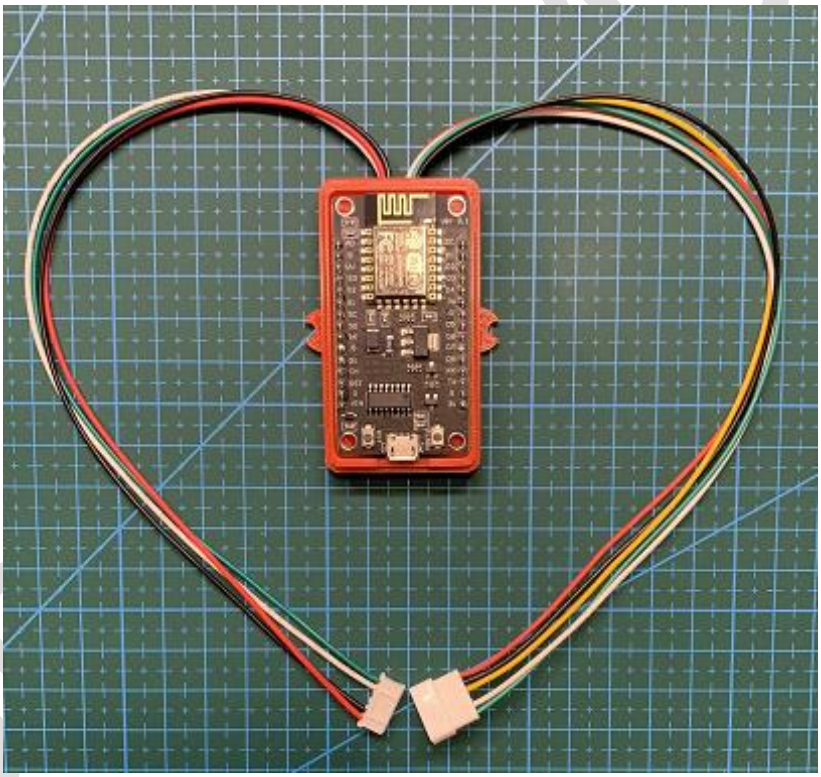

Figura 1 This dongle refers to DALY former connector

FEATURE SET

- Works with **JK-PBx BMS** via **RS485A** (UART1 protocol 000 or 001) via RJ45(Ethernet), via **RS485B** (UART2 protocol 001) or via **CAN BUS** (compatibility list here)

- Works with **JK-Bx BMS** having **UART** or GPS interface (compatibility list here)
  - Works with the listed JK having GPS connector ***Micro JST MX 1.25***

- Works with every **DALY** and Hi / 100Balance BMS (DALY Clone) with UART/RS232 interface
  - NOTE: original DALY Wi-Fi dongle, works ONLY with BMS from July 2023 !
  - Works with **NEW DALY** with smaller connector ***JST GH Series 1.25mm***
  - Works with **FORMER DALY** with standard connector ***Micro Mini JST 2.0 PH***

- Works **WITH** or **WITHOUT INTERNET** connection (WiFi Station or Access Point)
  - Perfect when you don't have Internet connection – Like on Boat, Cottage …
  - almost All the features are available on both AP and STA WiFi mode

- **SETUP** in 2 minutes !
  - Dongle starts as Access Point – you connect via WiFi and configure
  - Optional AT serial command interface for first provisioning available as well
  - Dongle version with local display to further easy the setup

- **MQTT Publisher** (TLS & JSON) to export main battery pack parameters and alarms
  - publish time can be set as little as 5 seconds
  - select which parameters you want to publish
  - Exports auto-generated .json config file for IoTMqttPanel cool mobile app
  - export multiple JSON-format or raw-format to be used with eg. Home Assistant
  - BROKER tested:
    - https://www.hivemq.com/ (TLS)
    - Mosquitto on Home Assistant (TLS / unencrypted)
    - MQTTHQ (unencrypted)
    - Home Assistant (Mosquitto) compatibility proven

- **MQTT Subscriber** limited to SWITCH MOS – you can manage Charge / Discharge and Balance switches remotely via MQTT – fully supported via IoTMqttPanel.
  Via MQTT, Virtual UART tunnel can be setup & enable as well.

- **MODBUS TCP Server**
  - Perfect for Home Assistant MODBUS Users
  - Perfect for Smartphone APPs like "Virtuino"
  - Perfect for Point-to-Point remote wifi COLOR display (Tasmota)

- **MODBUS TCP CLIENT**
  - The dongle connects to a MODBUS TCP Server to publish BMS Data
  - Select which parameters to update via json configuration file

- **HOME ASSISTANT AUTO-DISCOVERY**
  - Publish to HA the data-structure of the the dongle for easy integration

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- **PUSHSAFER & PUSHOVER Client -> SEND NOTIFICATION to your mobile or PC**
  - Send push Notifications to your Mobile, PC, Telegram etc !
  - Daily report sent at SunSet / SunRise / SOC 100% / Alarms info

- **COLOR DISPLAY** Support TASMOTA and OPENHASP projects to build a local / Remote MQTT/MODBUS COLOR DISPLAY
  - Script – instruction etc released to build a WiFi colour Display based on both the platforms.
  - OPENHASP works as MQTT only (no TLS no MODBUS)
  - TASMOTA works as MQTT (TLS supported) or MODBUS or both in parallel
  - Charts supported
  - Multiple Battery Packs (from different vendors) can be monitored with only one display
  - No – limits on the number of displays you may want to install / add

- **6++ months of daily storage** on-board - Monitor your batteries 24/7 with –
  - Auto setup depending on how many batteries are on the pack (up to 16)
  - Each battery is monitored , graphs ease the way to detect anything is wrong
    - tired batteries - battery under / overcapacity specs
    - balancer malfunction (MOS broken or bad wiring)
  - Every anomaly on you battery pack you find in a second!
  - SOC is monitored and synchronized with battery status

- **WEB PAGES** CHARGE-DISCHARGE current [I] cycles - SOC – and main BMS parameter

- **PASS-THROUGH**
  - **DALY** Smart Bluetooth WiFi / BLE dongle / original display, can be connected too and works in parallel
  - **JK** extensions connected to GPS Port can be used as well.

- **PACKET SNIFFER** between Bluetooth LE Dongle and DALY Smart BMS
  - Possibility to inject command to DALY/Hi & JK Smart BMS via web page
  - NOTE for memory needs this feature is disabled on the std SW – ask for a special SW release when needed

- **Virtual UART** (over TCP): Use DALY/JK BMS Original PC Software **via Internet**
  - the dongle allows to use DALY **BmsMonitorVx.x.x** PC software or **JK-BMS-MONITOR** to fully manage your BMS parameter even if you are NOT directly connected to the BMS – for security reason this feature must to be enabled under password protected pages or via MQTT, auto-expiring for activity for security.
  - Works as SERVER or CLIENT – trigger to enable vUART via MQTT or Web Page
  - Manage advanced monitorig including remote FW upgrade of your DALY / JK BMS wherever you are !

- **WEATHER FORECAST** and SunRise/SunSet based on your coordinates
  - TimeZone detection based on your coordinates
  - Current position on solar cycle – day to max/min – estimated daily light hours

- **UPGRADABLE** platform for improvement – and I release many …..

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ARE YOU A PROFESSIONAL USERS ?

Professional users who are selling / managing multiple battery packs, can provide to end-user/customers professional Smartphone interface to monitor their battery parameter, while being able to manage the battery pack via standard PC software from JK / DALY remotely.

Professional users can customize the following services according to their needs:

- Webpages feature set
- Webpages layout is customizable with your company brand / logos / colours set / links
- LCD display logo / info / behaviour
- IotMQTTApp mobile app layout customizable with the needed widgets
- Plastic case for 3D printers customizable with your logo / layout

COMPATIBILITY LIST

- JK-BD6AxxS-10P / JK-BD6AxxS-12P / JK-BD6AxxS-15P/ JK-B1AxxS-15PJK-B2AxxS-15P/ JK-B2AxxS-20P
- **JK-PB1x / JK-PB2x via RS485-A, RS485-B, CAN Connector**

- DALY – NEWER & FORMER Models with UART(1) Interface are supported

- Hi and 100Balance reported as functional on UART-GPS

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CAMPARISON DALY WIFI DONGLE (JK has not ;-))
vs
ScanLabs Smart BMS data Extractor

Feature	**DALY Wifi Module** **NO DONGLE AVAILABLE FOR JK**	**DALY & JK BMS WiFi** ***SmartBMS DATA EXTRACTOR***
Compatibility	works only with BMS released from July 2023 onward	works with **every** DALY Smart BMS with UART interface that supports the Bluetooth or WiFi original Dongle WORKs WITH **NEWER** and **FORMER** (different connectors) JK PBx and PX-Bx supported
Power Supply	Self-powered from BMS	Self-Powered for DALY and JK-Bx or via USB micro JK-PBx RS485A/B or CAN
Works without internet	yes – it switches to Bluetooth mode when wifi is not available	yes – configurable to work as **Access Point** or **WiFi Station** in AP mode , up to 4 Clients can connect
Log data w/o Internet	NO	yes – daly and 6m+ data logging always active
Real Time data	yes – when connected to cloud exports data every 3 minutes. Only current snapshot available – no history except failures-	yes – **data refresh down to 5s**, real time graph of all the batteries – SOC and Amps NOTE: BMS polling time down to 1s is supported upon requets.
Logging BMS data	partial – it logs only alarms via databms.com	yes – it logs 24/7 with 6 months data storage of each and every battery on the package and SOC
Data Export	NO	yes – it exports daily -all batteries data- as .CSV
HOME ASSISTANT	NO COMPATIBILITY	FULL COMPATIBILITY THANKS To MQTT or MODBUS TCP Bridges + HA Service Discovery
MQTT PUBLISHER	NO	yes – MQTT (/secure) NOTE: for iotMqtt Panel app, config export
MODBUS TCP CLIENT/SERVER	NO	yes – Server available on port 502 yes- Client fully configurable via json
REMOTE COLOUR DISPLAY	Only LOCAL and directly connected	yes – via MQTT or MODBUS NOTE: install as many display as you need NOTE: each display can monitor MULTIPLE BMS
NOTIFICATIONS	PARTIALLY	yes – SunSet/SunRise reports/Failures/100% SOC etc. via PUSHSAVER/PUSHOVER services
DALY PCMaster **JK-BMS-MONITOR** PC Internet connection	NO	yes – connect to BMS through PCMaster via Internet – UART over TCP (Virtual UART) Same feature for JK using JK-BMS-MONITOR
Bluetooth Passthrough	NA – Daly wifi dongle swithces from WiFi to Bluetooth LE if AP is not available	yes – ScanLabs WiFi dongle support passthrough feature allowing Bluetooth Daly dongle to be used in parallel – or DALY Monitor
Dimensions	37 x 34 x 7	67 x 37 x 1.9 YES Mine is bigger ;-)

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BUILD it for DALY or JK GENERAL INTRODUCTION

BILL OF MATERIAL

Building for JK or DALY (New or Classic connector) the process is almost the same. Of course, you have to purchase different materials as detailled below.
There are two main steps:

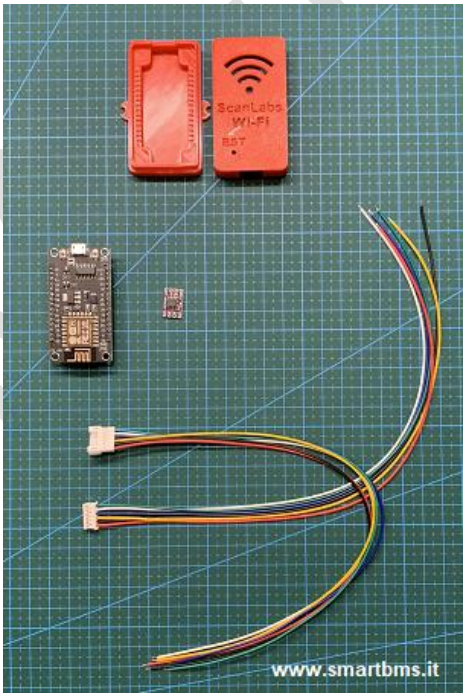
- For which BMS you need it (DALY old/new or JK-PBx , JK-Bx)
- You want to Power the dongle via USB OR you want to power the dongle via the BMS (not available for JK-PBx where no power PIN is available at the connectors)

Dedicated sections are provided to build for JK or DALY and with/without an integrated DCDC.

MAIN COMPONENTS:

Platform main core is ESP8266 – (ESP32 is on the way)
I suggest:

- NodeMCU V3 w/ 0.96" OLED DISPLAY
- NodeMcu-CH340-V3 w/o DISPLAY.



CABLE/Connectors:

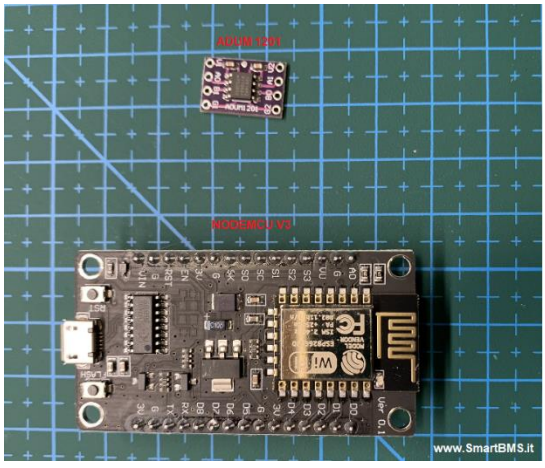
- **DALY NEW** (little 8mm)
  6pins JST GH Series 1.25
- **DALY CLASSIC** (larger 13mm)
  6pins Micro Mini JST 2.0 PH
- **JK-Bx BMS** (GPS Port)
  4pin Micro JST MX 1.25
- **JK-PBx** (RS485A/B or CAN)
  RJ45 Ethernet Plug

CASE/Enclosure:

- Free .STL are available looking for NodeMCU V3 STL such as THIS

DETAILED VIEW of NODEMCU V3 and ADUM 1201.

NOTE: NODEMCU comes with different USB-UART chipset. It does not matter which uart chipset is installed OR if it is MICRO-USB or USB-Type C as long as you are able to program the binary file provided.



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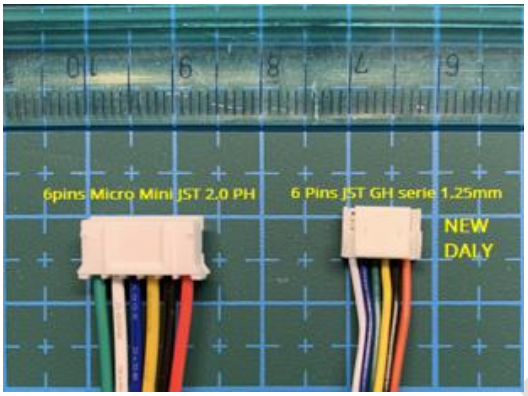
CABLE SELECTION

FOR DALY BMS

Daly BMS come with two kind of connectors.

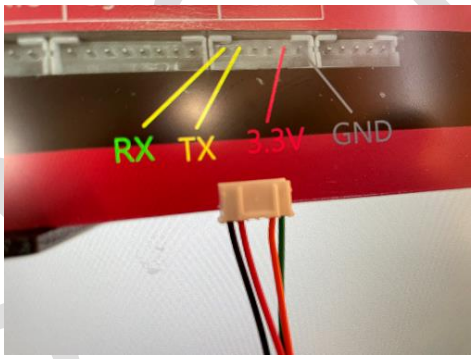
- **DALY NEW** (little 8mm)
  6pins JST GH Series 1.25

- **DALY FORMER** (larger 13mm)
  6pins Micro Mini JST 2.0 PH





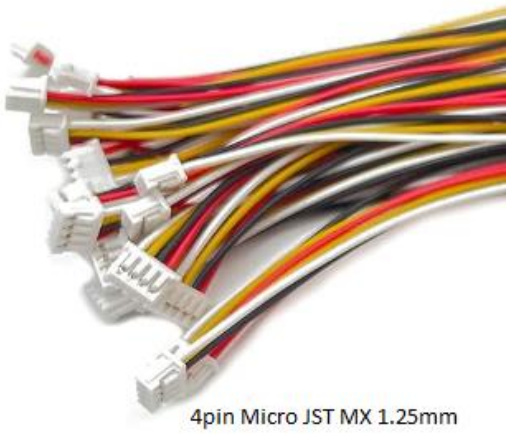
NEW DALY 6pins JST GH 1.25mm



CLASSIC DALY 6pins Micro Mini JST 2.0 PH

FOR JK-Bx BMS

Supported Models works via GPS Interface
4pin Micro JST MX 1.25
4pin Micro JST MX 1.25





NOTE: It does not exist on the market a Male cable JST MX 1.25 . If you need Pass-through feature, you need to build your own male cable.

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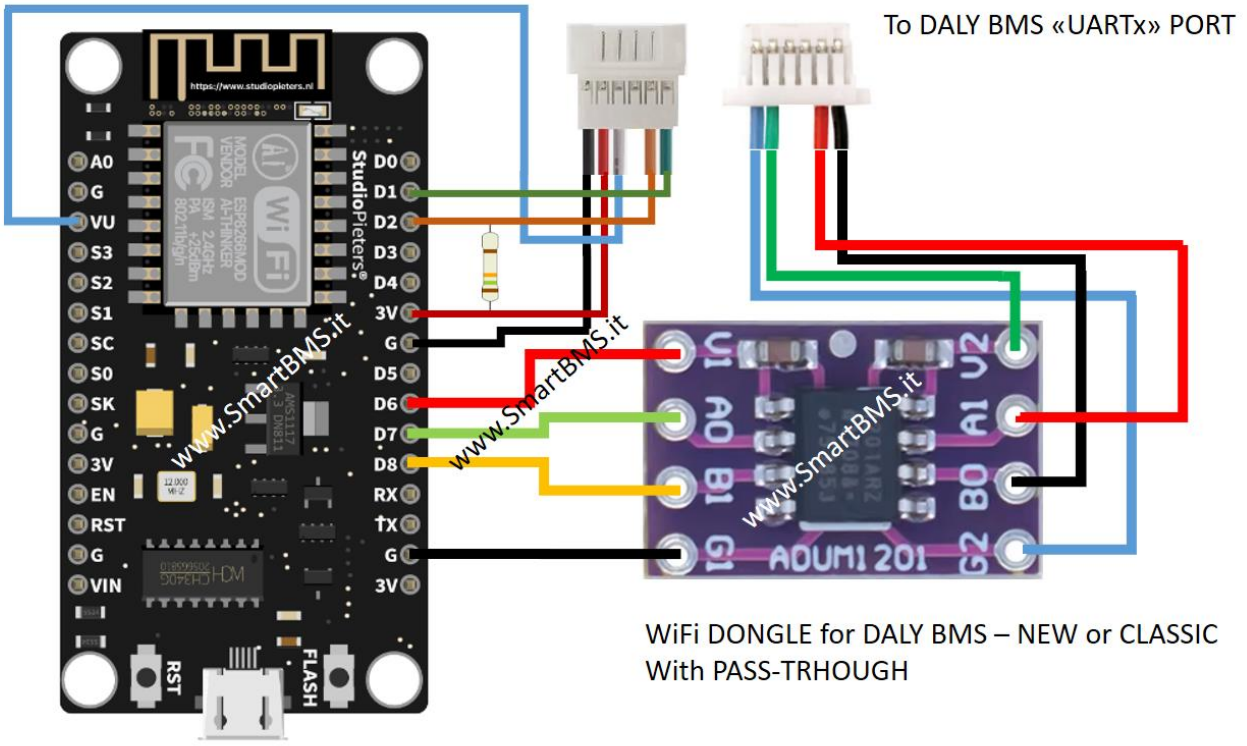
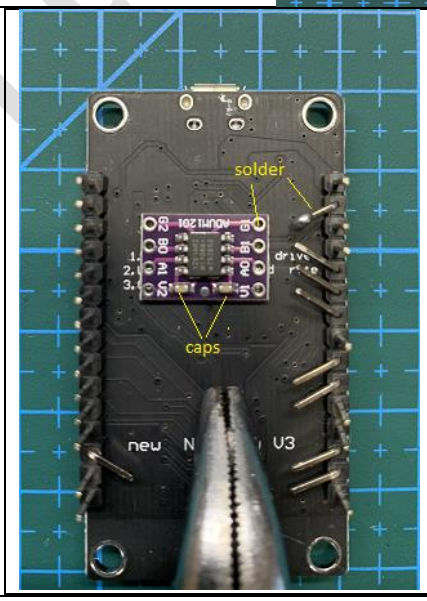
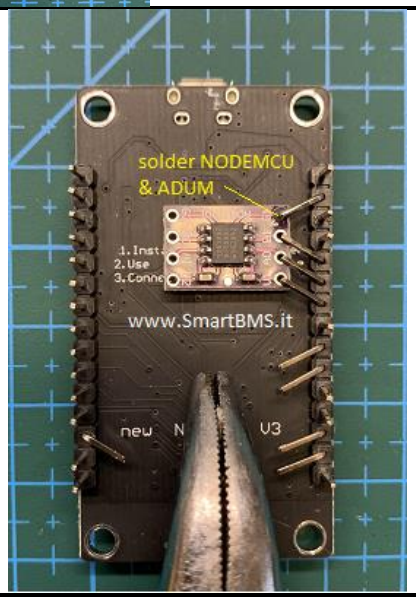
REFERENCE DIAGRAM FOR DALY – NEW OR CLASSIC MODEL – WITHOUT DCDC



STEP 1: ORIENTATION	
STEP 2 for **DALY BMS**: BEND THE NEEDED PINs NOTE 1: PINs are bended with an angle of about 45 degrees – Why? See next pictures . This is NOT a must to do, is simply a way to speed up the mounting process NOTE 2: if Pass-Through feature is not needed - you can SKIP to bend pins 9-10-13-14 (ref. Pin 1 is top right on the image) and pin 13 on the left strip line	
STEP 3: ALIGN ADUM1201 and Solder IT ADUM1201 – G1 to 2nd PIN of NODEMCU USE ADUM1201 CAPS to place it	 

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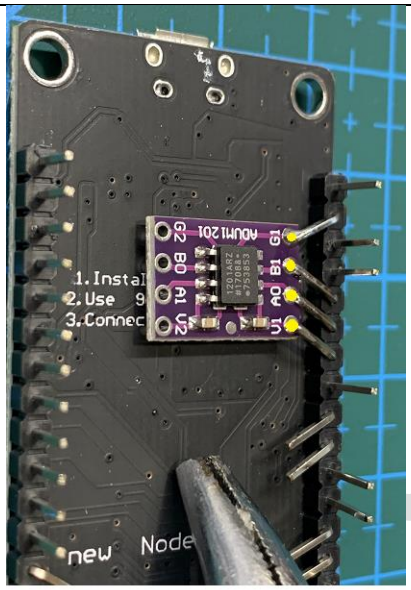
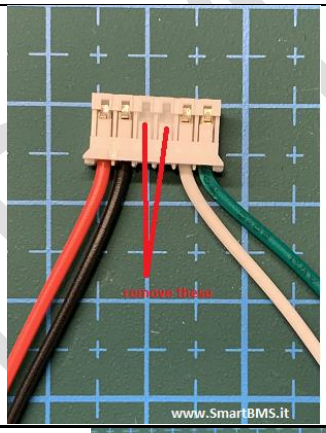
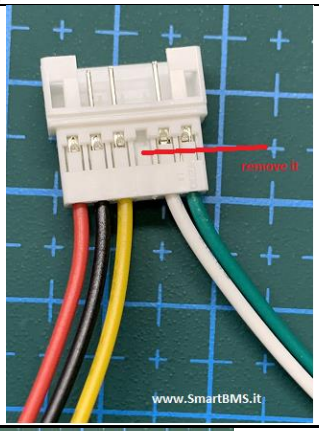
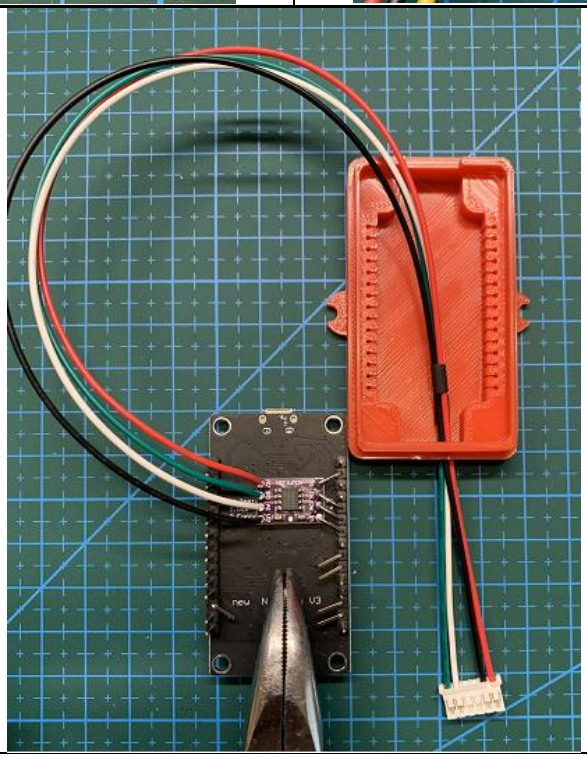
STEP 4: SOLDER ADUM1201 to NODEMCU		
STEP 5 **DALY BMS**: CONNECTORS FEMALE Connector is a MUST – WiFi Dongle "talk" with DALY BMS through this cable. Central PINs are not Needed – REMOVE THEM MALE Connector is OPTIONAL and Needed ONLY if you want to use the Pass Through feature	Mandatory FEMALE 	Optioninal MALE – PASS THROUGH- 
STEP 6 **DALY BMS**: CABLING DO NOT MIX CABLES – FOLLOW THE IMAGE		

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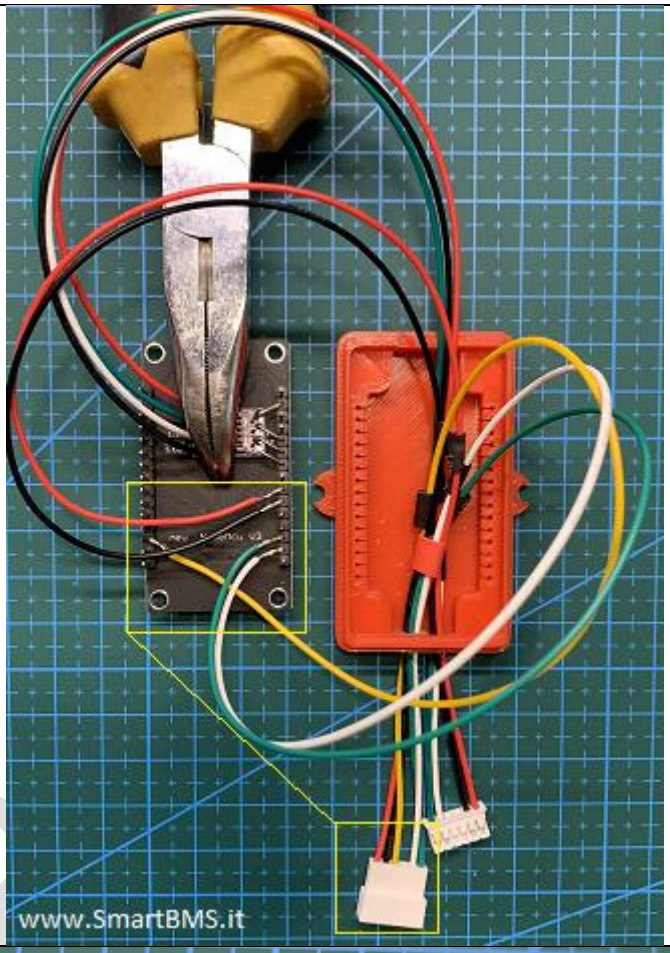
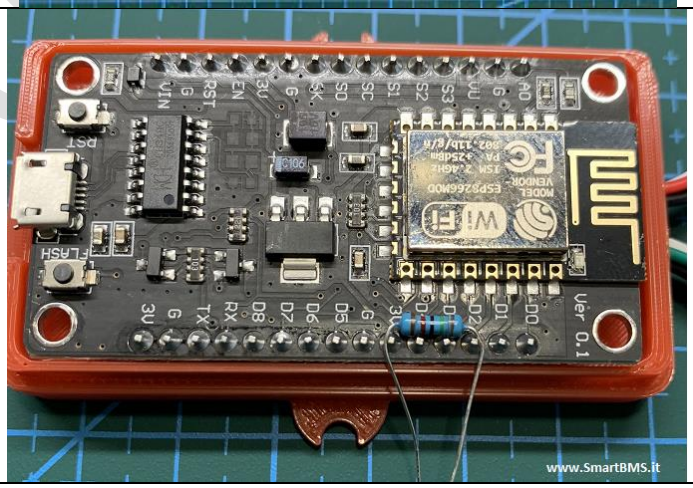
STEP 6A **DALY BMS**: CABLING ***OPTIONAL*** "PASS- THROUGH"	
STEP 7 **DALY & JK** : OPTIONAL "PASS-THROUGH" Add a 10Kohm to 15kohm resistor between 3V and D2 NODEMCU Pin	

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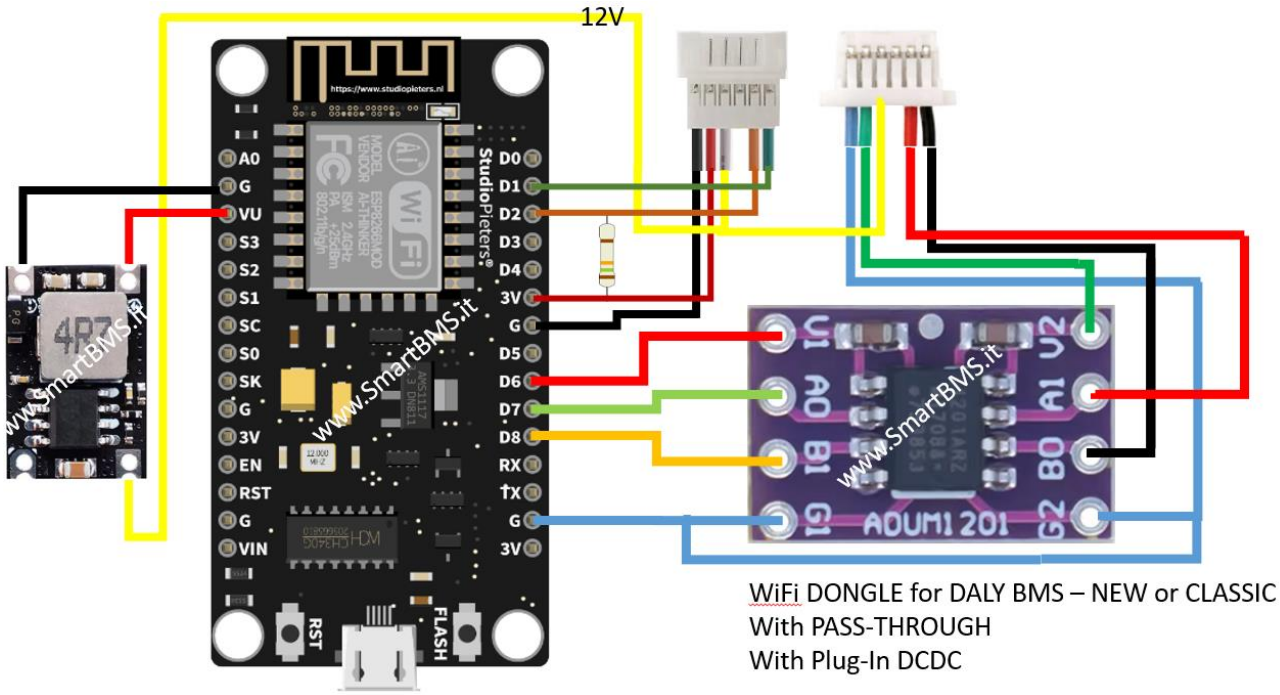
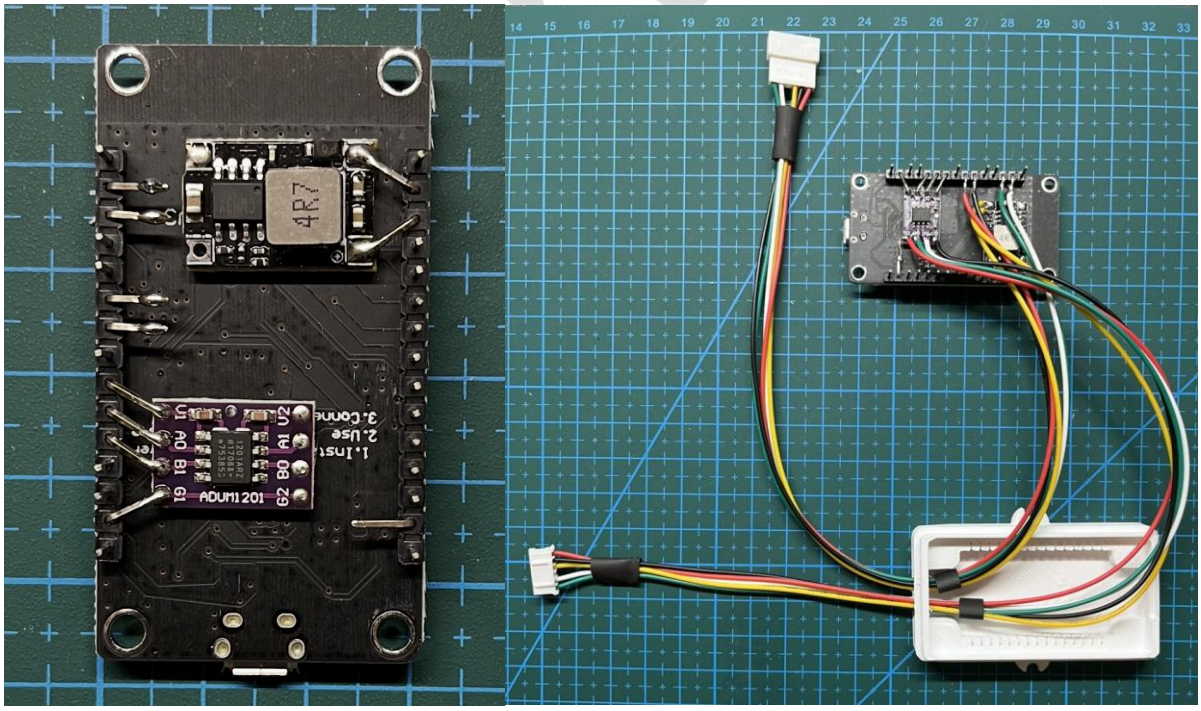
DALY / Hi / 100BALANCE need a **20Vin+ DCDC to 5Vout** like this : ***Aliexpress Link***



NOTE: ADUM1201 is needed to provide the right signals to let NodeMCU Booting

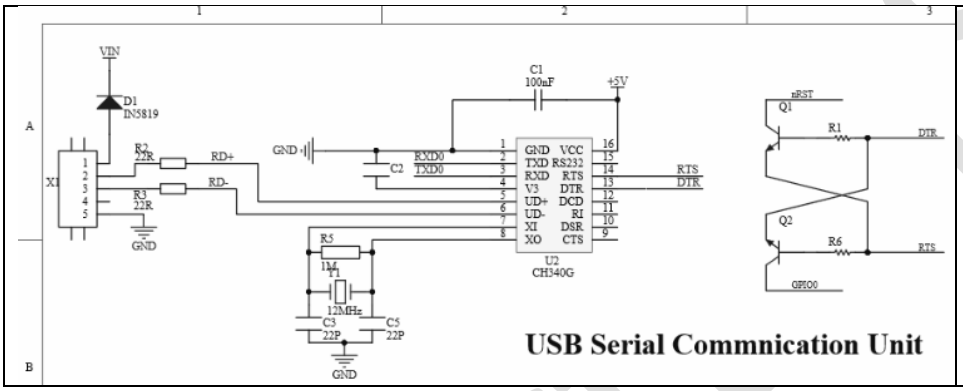


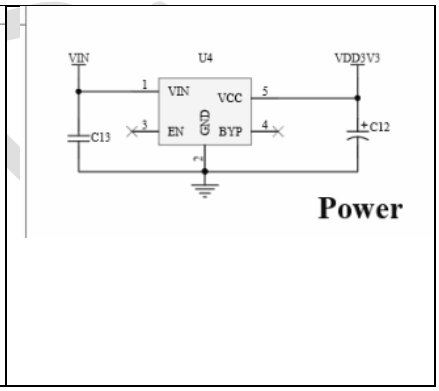
NOTE: LASTEST NODEMCU V3 schematic is reported on the images below.



PIN 1 of X1 (USB connector) is routed to VU pin (13) . This connection could not be available on old NODEMCU model. If connecting the DCDC on VU pins (13) is not powering up the NodeMCU, please use VIN pin (1) instead.

Theoretically U4 (AMS1117 Voltage regulator) can manage as much as 20V – so you could connect it directly to the 12V pin of Daly – I DO NOT Suggest this , I had different NodeMCU burned out because low thermal dissipation of this LDO.





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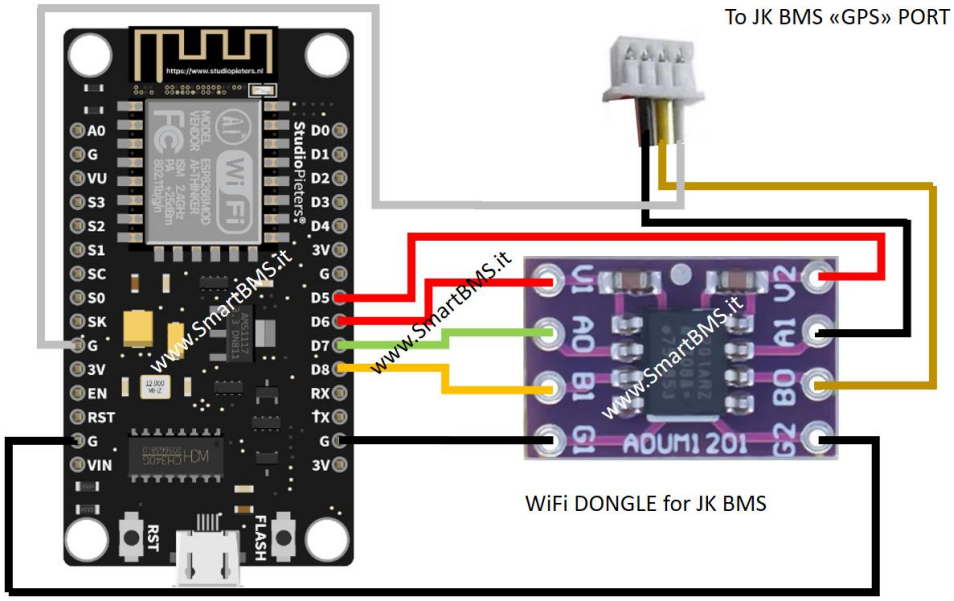
REFERENCE DIAGRAM for JK-Bx – w/o PASSTHROUGH Feature w/o DCDC



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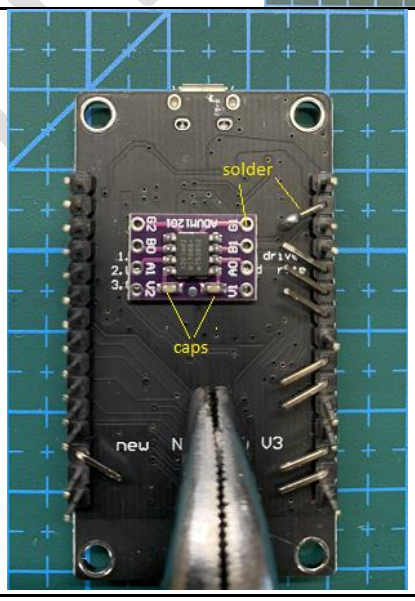
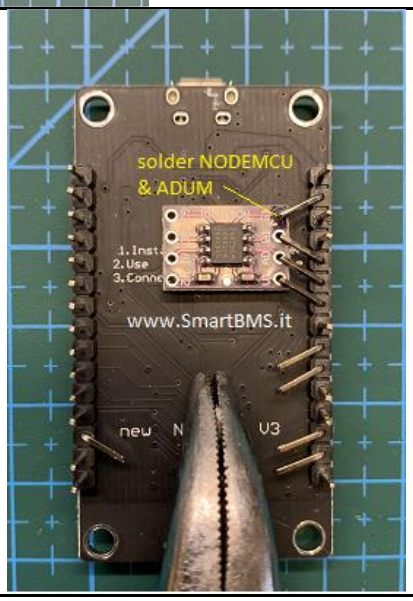
STEP 1: ORIENTATION	
STEP 2 **JK BMS**: BEND THE NEEDED PINs NOTE 1: PINs are Bended with an angle of about 45 degrees – Why? See next pictures . This is NOT a must to do, is simply a way to speed up the mounting process NOTE 2: if Pass-Through feature NOT supported for JK	
STEP 3: ALIGN ADUM1201 and Solder IT ADUM1201 – G1 to 2nd PIN of NODEMCU USE ADUM1201 CAPS to place it	 

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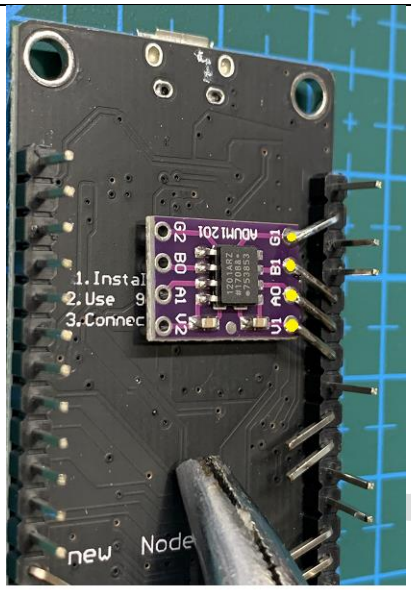
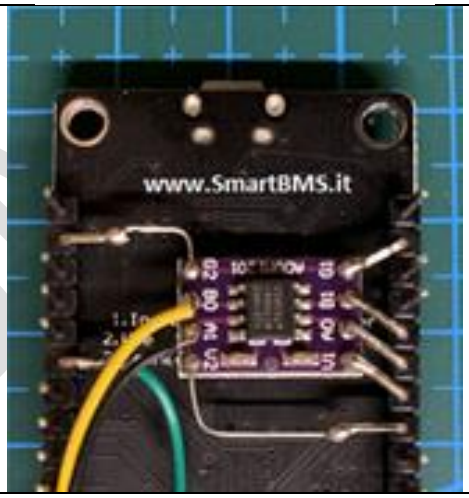
STEP 4: SOLDER ADUM1201 to NODEMCU	
STEP 4A: **ONLY FOR JK** add Connection to GND and VCC Pin NOTE : Agree – in this case ADUM is not really Isolating – or – is partially Isolating . This is the quickest way to cabling and let NodeMCU to boot.	

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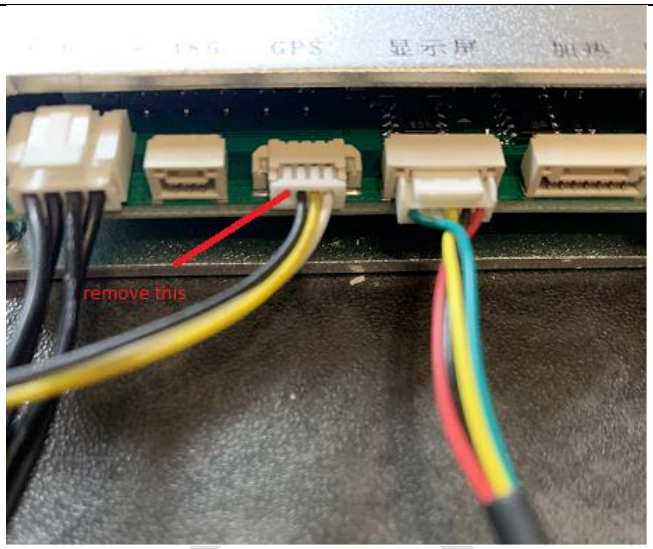
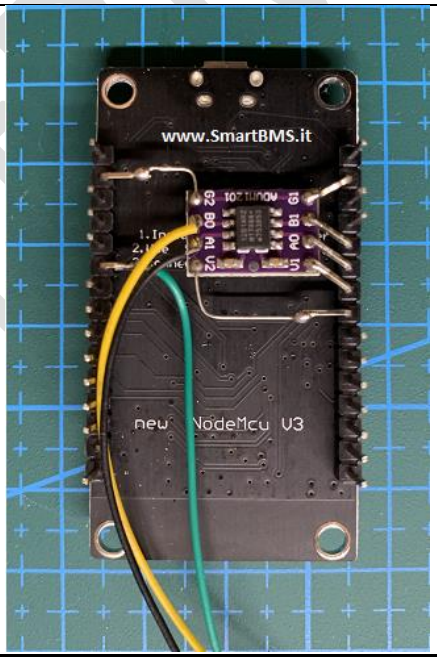
STEP 5 **JK-Bx BMS**: CONNECTORS ATTENTION! PIN SHOWN in Figure is a VBAT voltage (on a 16s is around 50v) You cannot use it unless you know what you are doing . Better to remove ;-)	
STEP 6 **JK-Bx BMS**: CABLING DO NOT MIX CABLES – FOLLOW THE IMAGE	 
STEP 6A: CABLING OPTIONAL “PASS- THROUGH”	TBD

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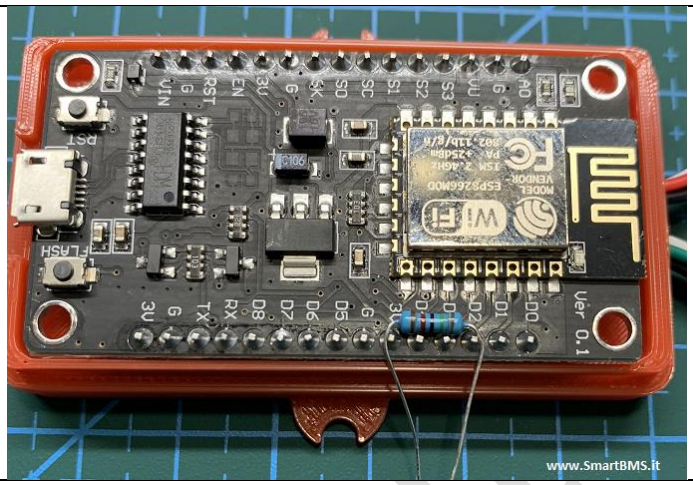
STEP 7: OPTIONAL “PASS-THROUGH” Add a 10Kohm to 15kohm resistor between 3V and D2 NODEMCU Pin	

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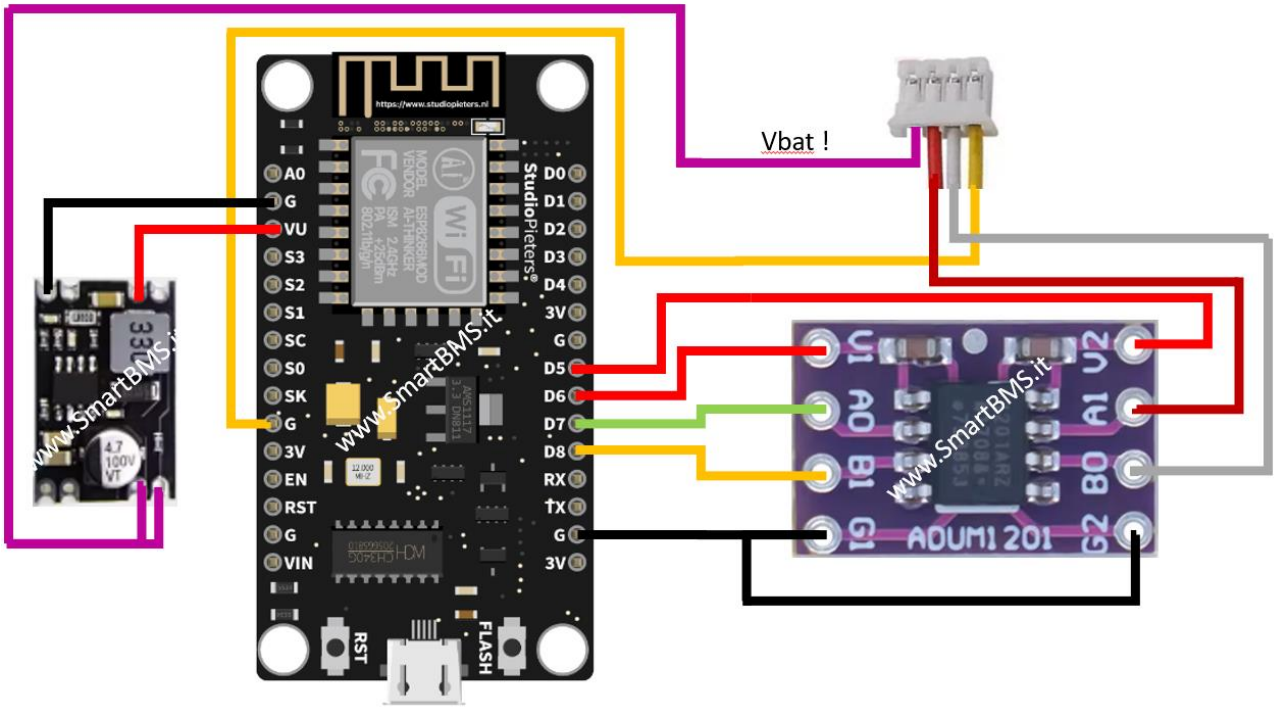
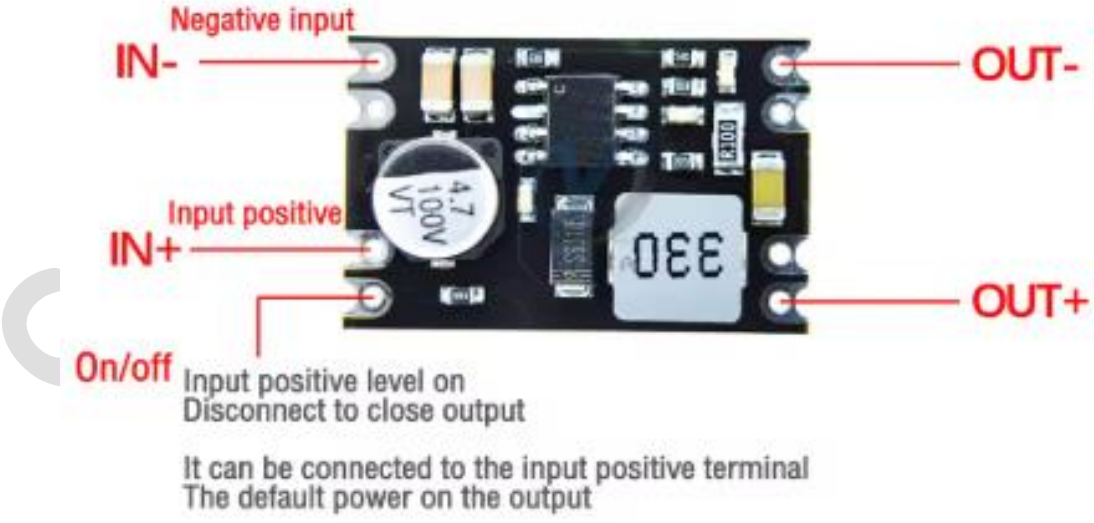
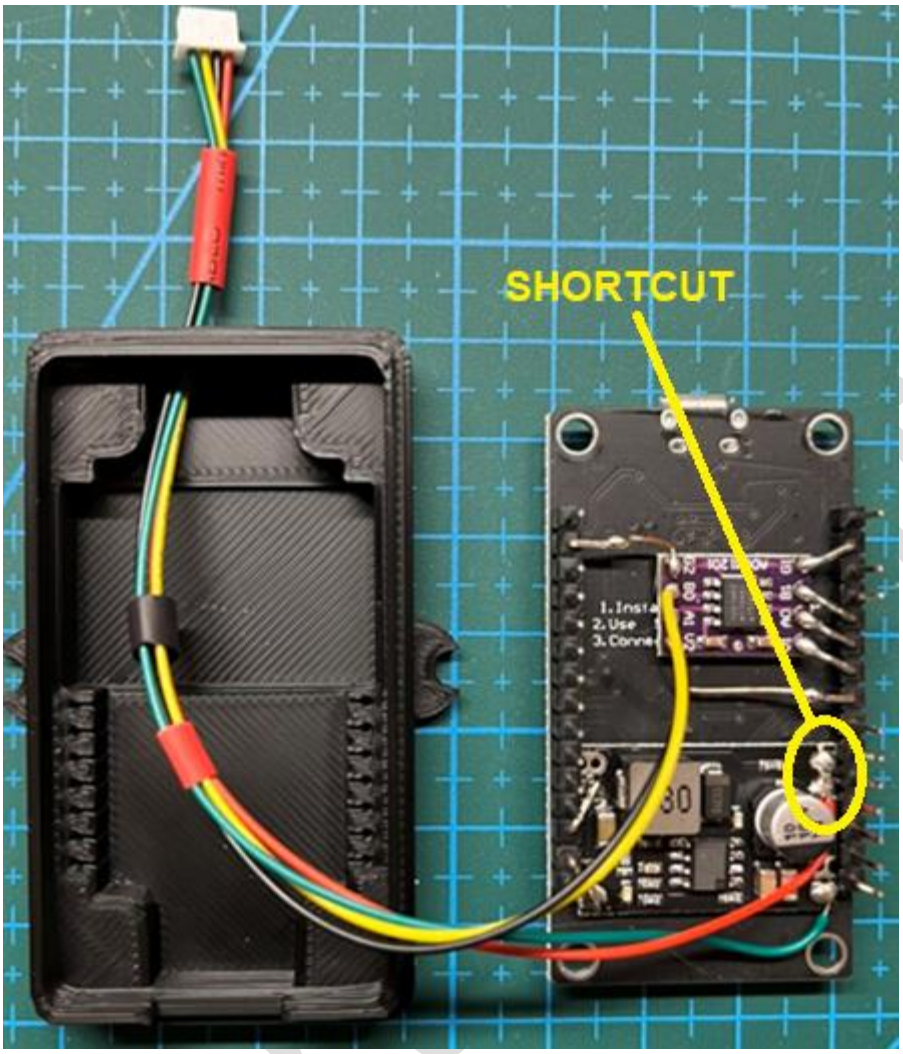
REFERENCE DIAGRAM FOR JK-Bx WITH DCDC

JK-Bx BMS with GPS port needs a DCDC up to the **Vbat** down to 5V – I suggest a **DCDC 100Vin ->5Vout** like this one: ***Aliexpress link***







NOTE: DCDC – RED CABLE – SHORTCUT IN+ and ON/OFF PINs

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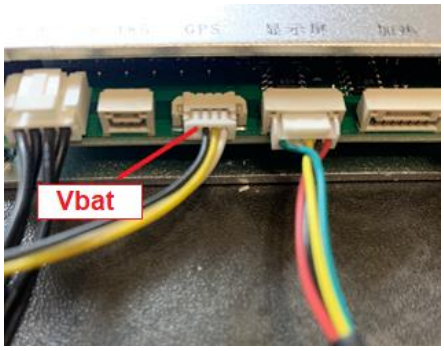
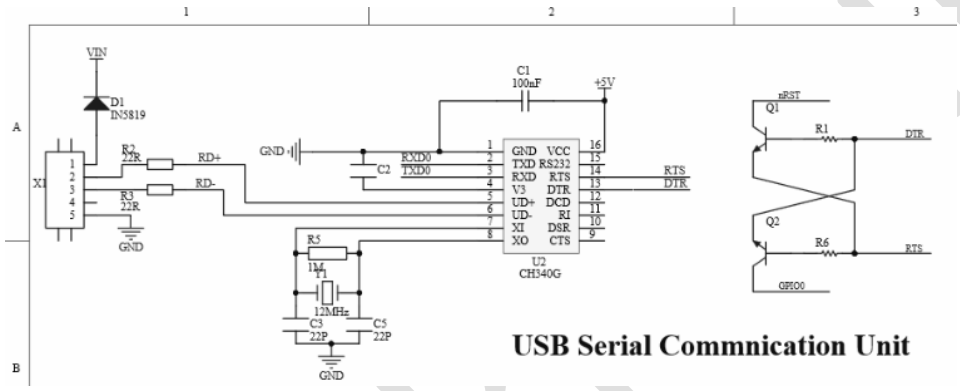
NOTE: LASTEST NODEMCU V3 schematic is reported on the images below.



PIN 1 of X1 (USB connector) is routed to VU pin (13) . This connection could not be available on old NODEMCU model. If connecting the DCDC on VU pins (13) is not powering up the NodeMCU, please use VIN pin (1) instead.



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BUILD ScanLabs SmartBMS Data Extractor for JK-PB1x & JK-PB2x

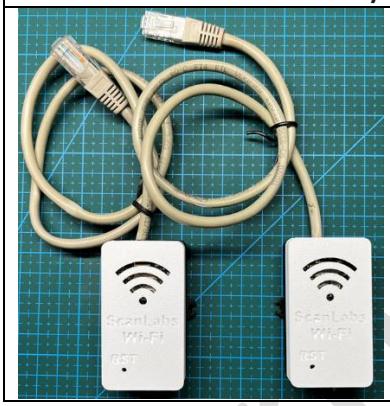
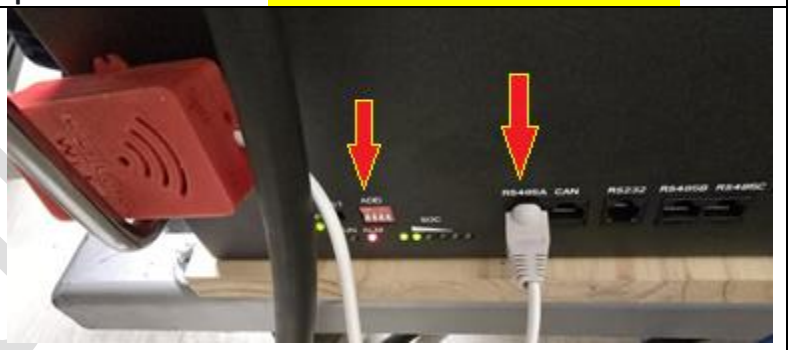
JK-PB1x & JK-PB2x models are supported via:

- **RS485A** port (the closest to the dipswitches)
  Protocol supported (use JK mobile APP to configure): 000 and 001
- **RS485B** port (at the right of RS232 socket)
  Protocol supported (use JK mobile APP to configure): ONLY 001
- **CAN** connector (at the right of RS485A port)
  Protocol suppported: ONLY Modbus 001 115K

NOTE: tipically RS485B is meant for internal communication between multiple JK BMS but we can use it if free.
NOTE: when possible use protocol UARTx protocol "001 – JK BMS RS485 Modbus V1.0" ,
it gives 3 advantages:

1. Provides the most completed set of data
2. It's lighter, allowing a polling time down to 1s
3. Allows to remoteley connect via Internet/Lan to the JK via ***JK-BMS-MONITOR*** Pc Software

NOTE: CAN is supported in **read only** mode – no actions on MOS and less info available

SUGGESTED: RS485A/B port setup as UART1 Protocol 001 – JK BMS RS485 Modbus V1.0	
	

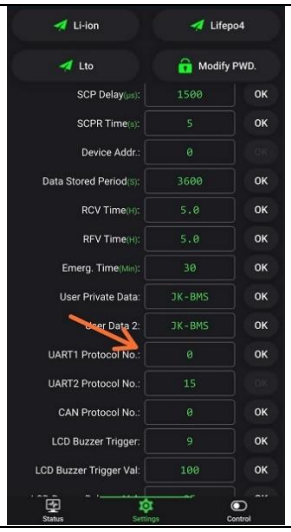
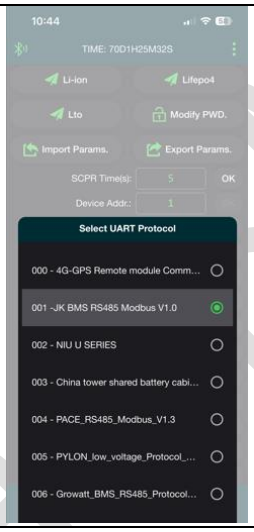
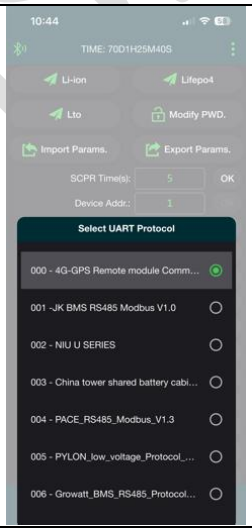
IMPORTANT

You need to apply some JK-PBx BMS settings on "**UART1 Protocol No**" –
apply the following via JK Bluetooth app to be sure to enable the RS485A/B port to expose the right protocol.

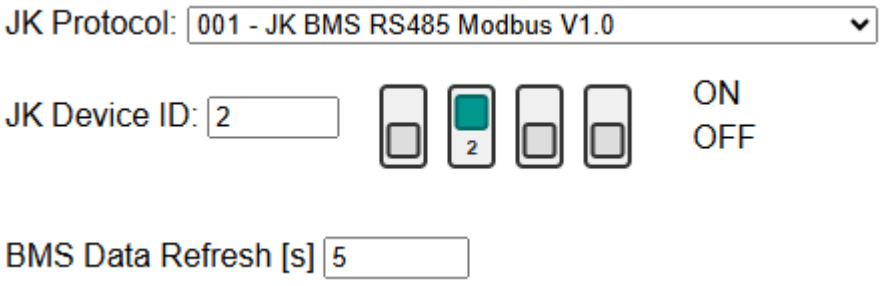
NOTE: from *ScanLabs SmartBMS data Extractor* Fw version 3.5.0 the following protocols are supported:

- 000 – 4G-GPS Remote Module, Common Protocol V4.2
- 001 – JK BMS RS485 Modbus V1.0 [SUGGESTED]

*NOTE: Protocol 001 is recommended for JK-PBx users, as it enables **JK-BMS-MONITOR** to work remotely via the Virtual UART feature and expose additional parameters like resistance and switch settings

Settings	SUGGESTED OK FOR JK-BMS-MONITOR	JK-BMS-MONITOR KO!
		

NOTE: using **"UARTx Protocol No**: 001 – JK BMS RS485 Modbus V1.0" the DEVICE ID set via the 4-positions dip-switches must be the same on JK BMS Panel and on the Scanlabs SmartBMS data Exctractor. Settings->MISC page



BILL of MATERIAL for JK-PBx via RS485A or B

There are three possible ways to build your ***ScanLabs SmartBMS Data Extractor*** for JK-PBx via RS485A or RS485B (note conenction via CAN BUS is described later)

1- Fully Isolated – RECOMMENDED !
2- Partially Isolated – It works
3- Not Isolated – just for test

Each solution you can build it using NodeMCU V3 with or without OLED display

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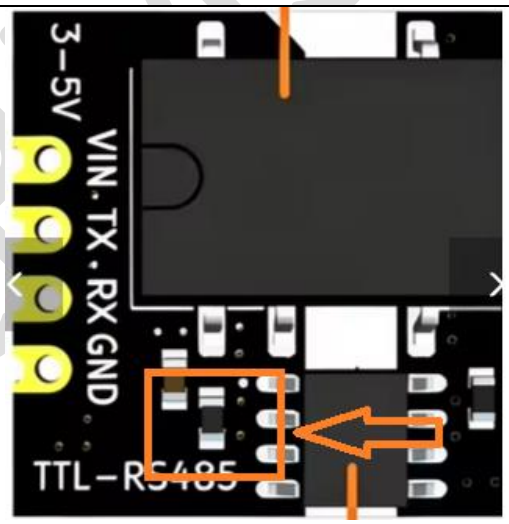
FULLY ISOLATED RS485 CONNECTION >> RECOMMENDED SOLUTION <<

1- NODEMCU V3 (ESP8266) – Aliexpress Link or NODEMCU V3 with 0.96” OLED DISPLAY – Aliexpress Link -
2- Isolated TTL to RS485 – Aliexpress Link –
3- An Ethernet Cable to be sacrificed
4- Latest ScanLabs SW release

NOTE: **Aliexpress links** are SIMPLY suggestions; you can buy where you want

STEP1 – REMOVE the resistor pointed with the arrow and zoomed in on the images below WHY? This resistor does not allow NodeMCU booting up	
	

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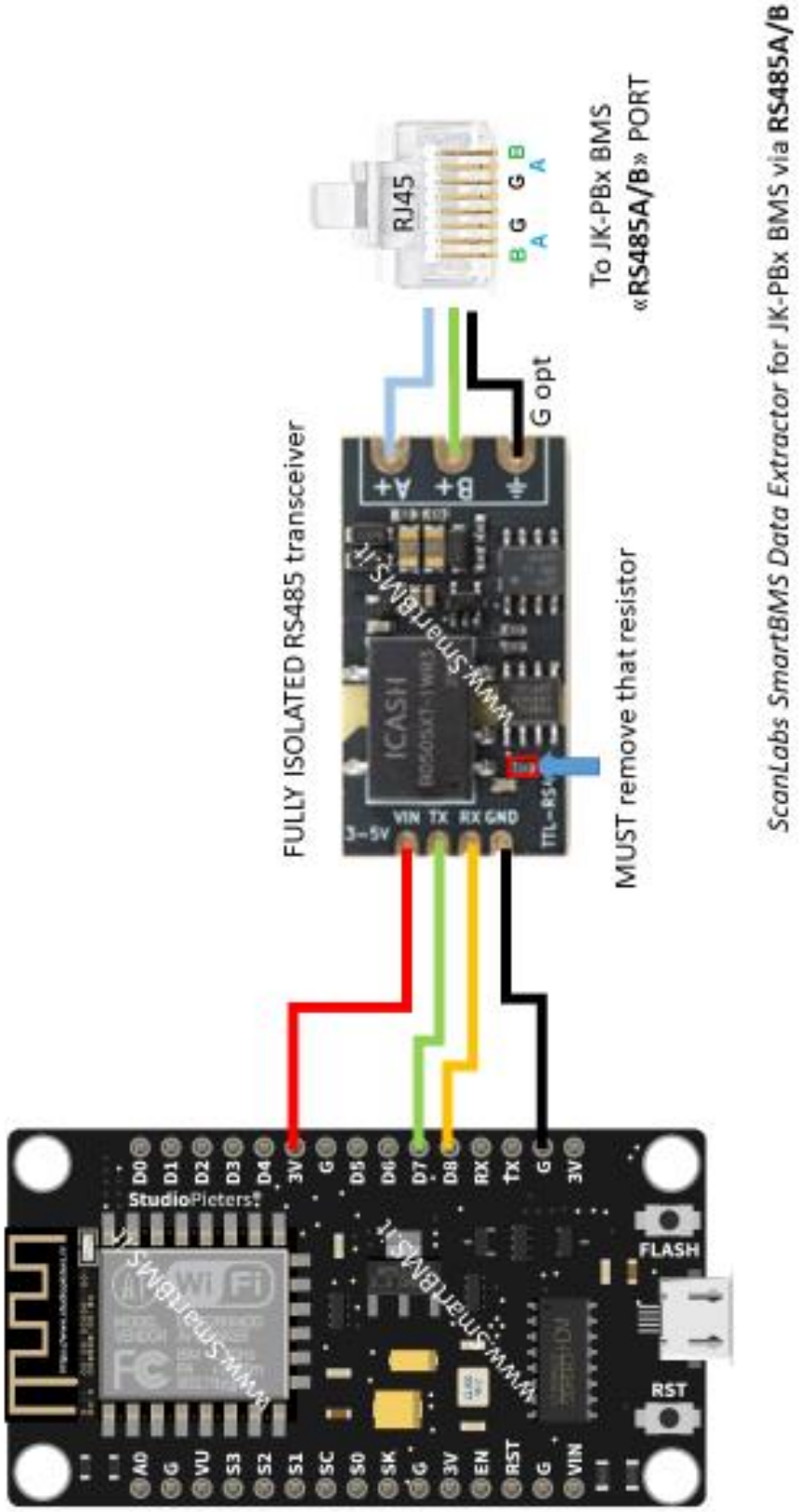
FULLY ISOLATED RS485 transceiver
MUST remove that resistor
G opt
To JK-PBx BMS
«RS485A/B» PORT
RJ45
ScanLabs SmartBMS Data Extractor for JK-PBx BMS via RS485A/B
FLASH
RST
StudioPieters

ScanLabs SmartBMS Data Extractor OLED for JK-PBx BMS via RS485A/B
To JK-PBx BMS
«RS485A/B» PORT
RJ45
B G G B
A A
G opt
FULLY ISOLATED RS485 transceiver
MUST remove that resistor
A+ B+ ⏚
VIN TX RX GND
3-5V
ICASH
www.SmartBMS.it
D0 D1 D2 D3 D4 3V G D5 D6 D7 D8 RX TX G 3V
A0 G VU S3 S2 S1 SC SO SK G 3V EN RES G VIN
FLASH
RST

PARTIALLY ISOLATED RS485 CONNECTION >> IT WORKS <<

1- NODEMCU V3 (ESP8266) – Aliexpress Link or NODEMCU V3 with 0.96” OLED DISPLAY – Aliexpress Link -
2- ADUM1201 – Aliexpress Link –
3- RS485 to TLL – Aliexpress Link –
4- An Ethernet Cable to be sacrificed
5- Latest ScanLabs SW release

NOTE: **Aliexpress links** are SIMPLY suggestions; you can buy where you want

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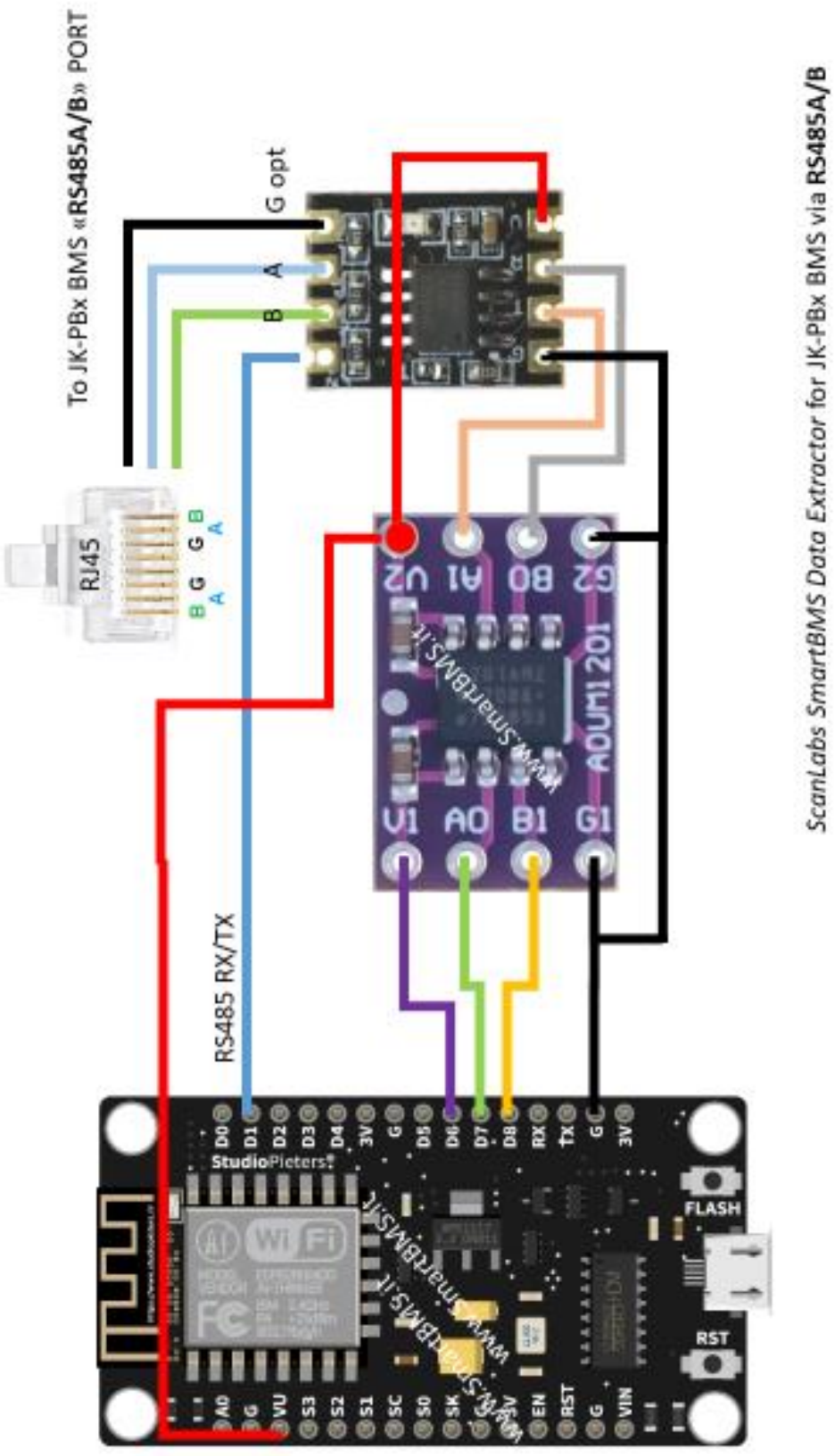
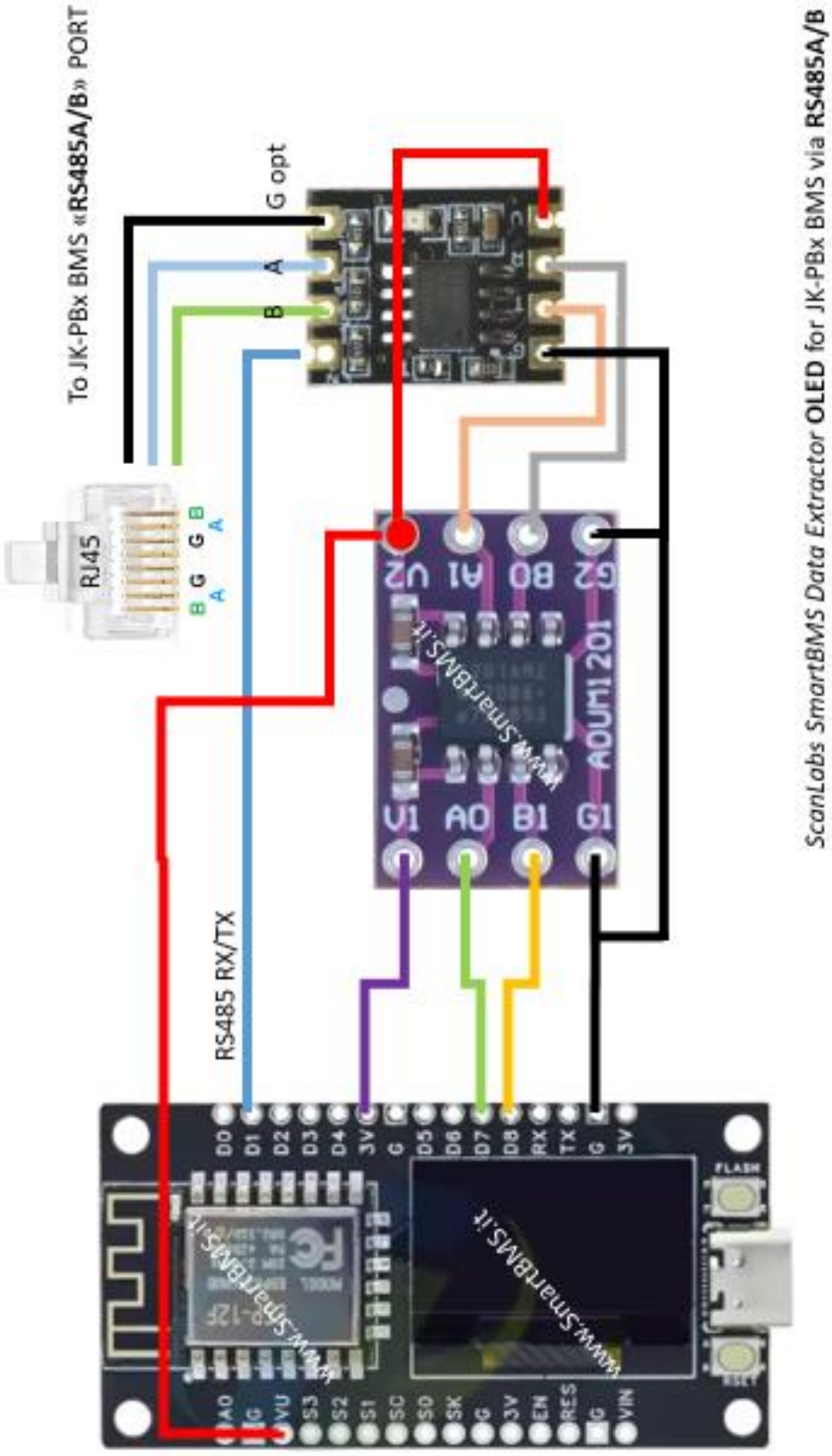

To JK-PBx BMS «RS485A/B» PORT
G opt
B
A
RJ45
B G G B
A A
V2 A1 B2 G2
AOUH1201
V1 A0 B1 G1
RS485 RX/TX
D0 D1 D2 D3 D4 3V G D5 D6 D7 D8 RX TX G 3V
StudioPieters
FLASH
RST
A0 VU S3 S2 S1 SC S0 SK 3V EN RST G VIN
ScanLabs SmartBMS Data Extractor for JK-PBx BMS via RS485A/B

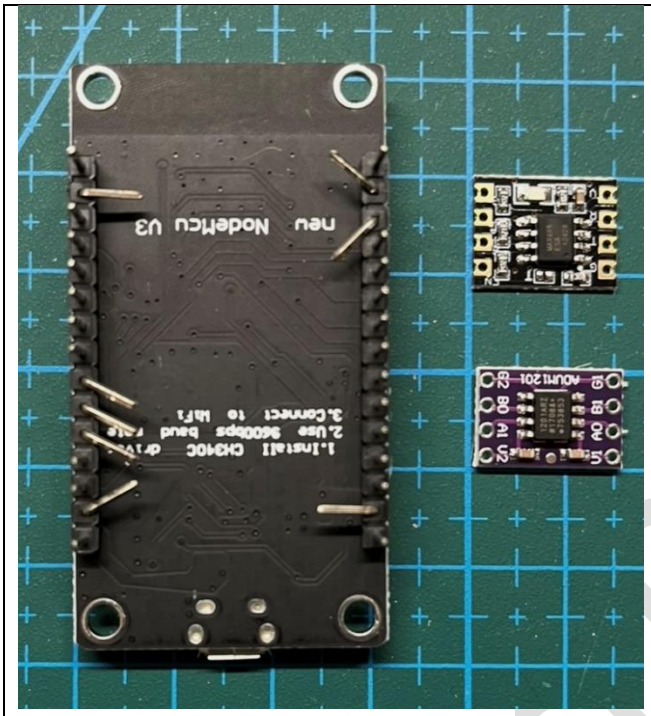


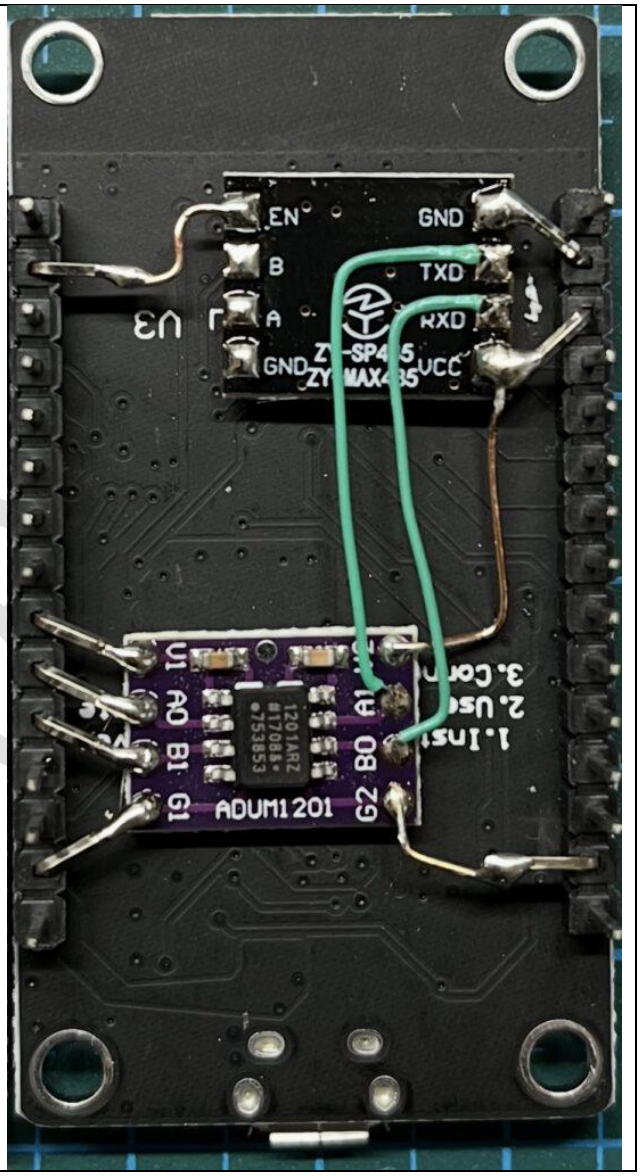
ScanLabs SmartBMS Data Extractor **OLED** for JK-PBx BMS via **RS485A/B**

Real life example:

NOTE: the Bottom-right PIN on the image below is used as TX-RX switch needed by the selected RS485<->TTL , some converter doesn't need any TX-RX commands – in this case simply do not connect this pin.

PREPARE THE STUFFS





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NON ISOLATED RS485 CONNECTION >> TEST ONLY <<

1- NODEMCU V3 (ESP8266) – Aliexpress Link or NODEMCU V3 with 0.96” OLED DISPLAY – Aliexpress Link -
2- RS485 to TLL – Aliexpress Link –
3- An Ethernet Cable to be sacrificed
4- Latest ScanLabs SW release

NOTE: **Aliexpress links** are SIMPLY suggestions; you can buy where you want

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To JK-PBx BMS «RS485A/B» PORT
RJ45
B G G B
A A
G opt
NOT ISOLATED RS485 transceiver
ScanLabs SmartBMS Data Extractor for JK-PBx BMS via RS485A/B
D0 D1 D2 D3 D4 3V G D5 D6 D7 D8 RX TX G 3V
StudioPieters
FLASH
RST
A0 G VU S3 S2 S1 SC S0 SK G 3V EN RST G VIN

To JK-PBx BMS «RS485A/B» PORT
RJ45
B G G B
A A
G opt
NOT ISOLATED RS485 transceiver
ScanLabs SmartBMS Data Extractor OLED for JK-PBx BMS via RS485A/B
www.SmartBMS.it
D0 D1 D2 D3 D4 3V G D5 D6 D7 D8 RX TX G 3V
FLASH
RESET
A0 G VU S3 S2 S1 SC SD SK G 3V EN RES G VIN

JK-PBx - RS485A/B via RJ45 Wiring

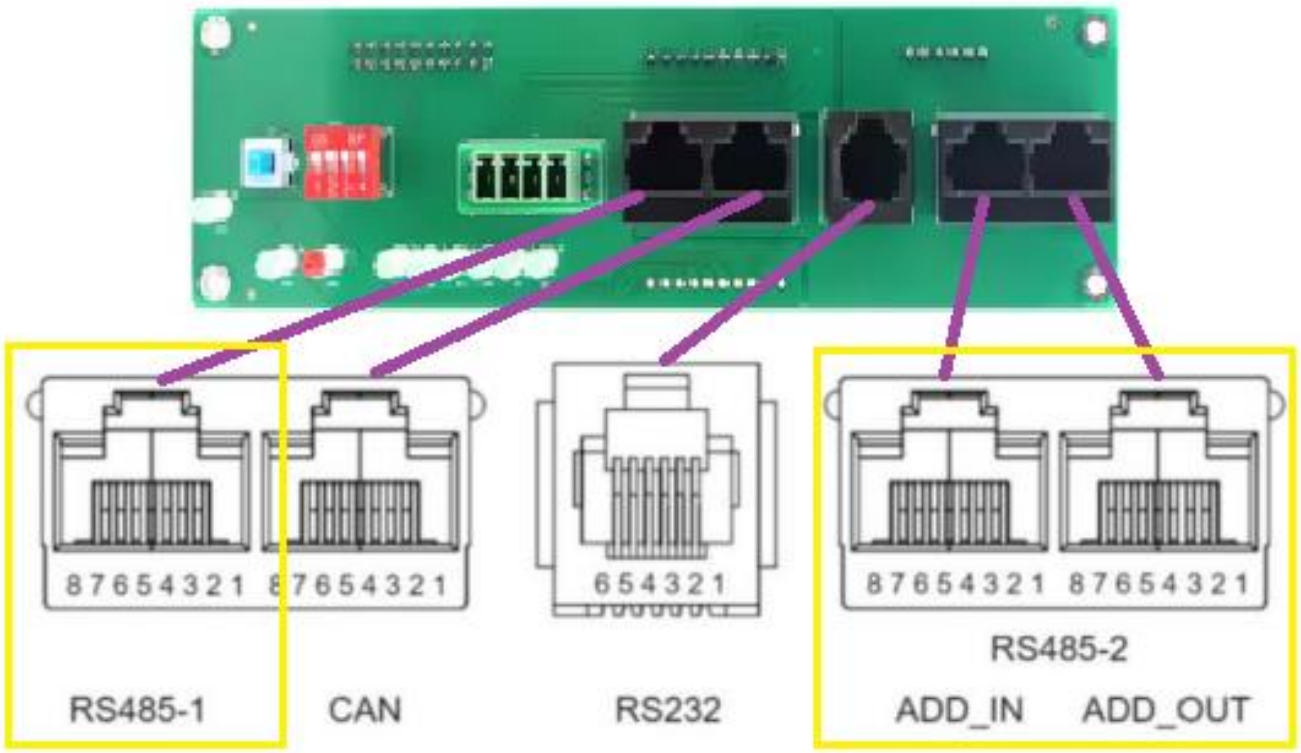
On the RJ45 connector we are going to use ony 2 MAX 3 wires :

1 or 8 -> RS485 **B**
2 or 7 -> RS485 **A**
3 or 6 -> RS485 **GND ****

(***optional and **NOT** recommended needed only for long ETH cable or other transceivers)

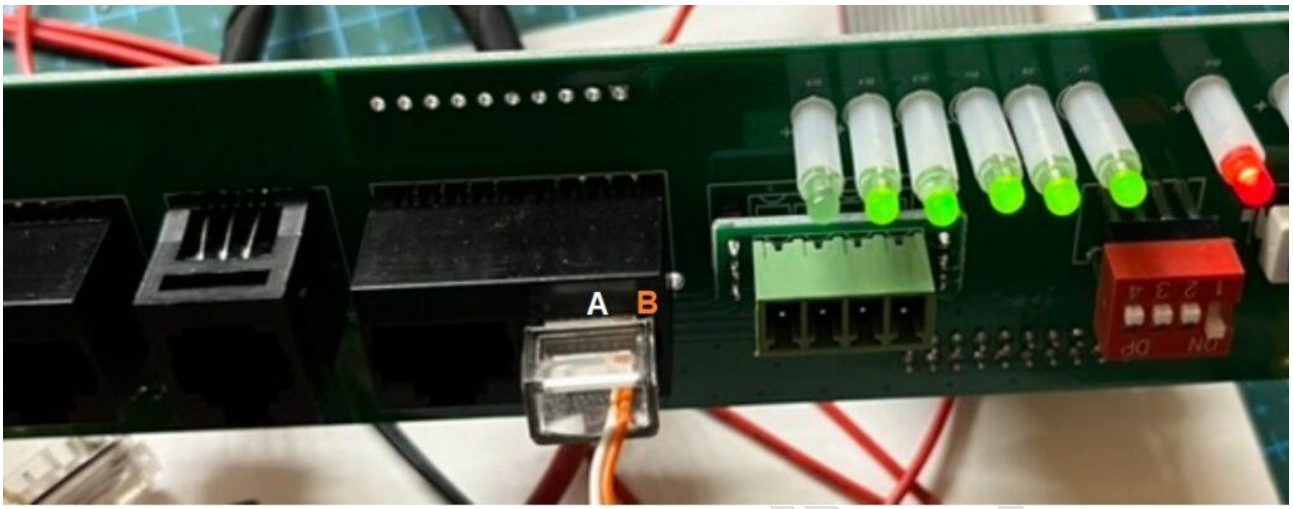
To avoid any trivial question … YES you understood well , RJ45 1 OR 8 goes to B pad on the RS485 converter,

RJ45 2 OR 7 goes to A pad and when GND is needed , RJ45 3 OR 6 goes to GND Pad



接　口 Connector	RS485-1		CAN1		RS323		RS485-2 • 2	
功能描述 Function	连接上位机或逆变器 (Connected PC or PCS)		连接上位机或逆变器 (Connected PC or PCS)		连接上位机 (Connected PC)		并机通信 (Parallel communication) • 2	
引脚说明 Pin specification	PIN	Description	PIN	Description	PIN	Description	PIN	Description
	1、8	RS485-B1	1、8	NC	1、2、6	NC	1、8	RS485-B2
	2、7	RS485-A1	2、7	NC	3	TX	2、7	RS485-A2
	4	NC	4	CANH1	4	RX	4、5	NC
	5	NC	5	CANL1	5	GND	3	IN(L)/OUT(R)
	3、6	GND	3、6	GND			6	GND

Practical example of using RS485A (or 1) on JK-PBx panel



NOTE: Some RS485<->TTL need GROUND as well. If you do not use the suggested converter, you have to perform your tests.

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BILL of MATERIAL for JK-PBx via CAN BUS CONNECTION

1- NODEMCU V3 (ESP8266) – Aliexpress Link
2- TTL to CAN – Aliexpress Link – (MCP2515 + TJA1050)
3- An Ethernet Cable to be sacrificed
4- Latest ScanLabs SW release

NOTE: **Aliexpress links** are SIMPLY suggestions; you can buy where you want

NOTE: unfortunately because of signal mismatch, or NODEMCU V3 with 0.96" OLED DISPLAY cannot be used in CAN mode

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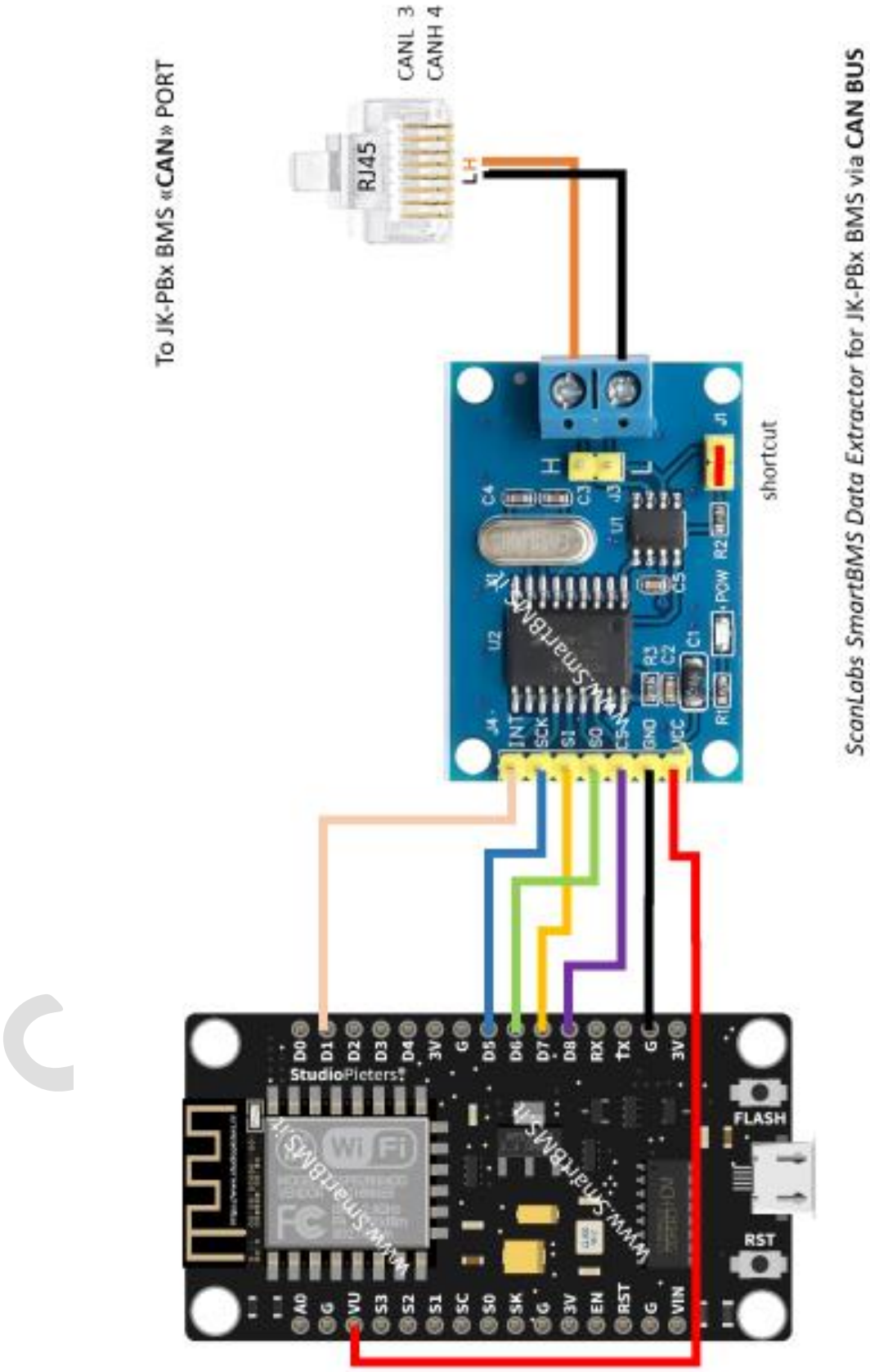
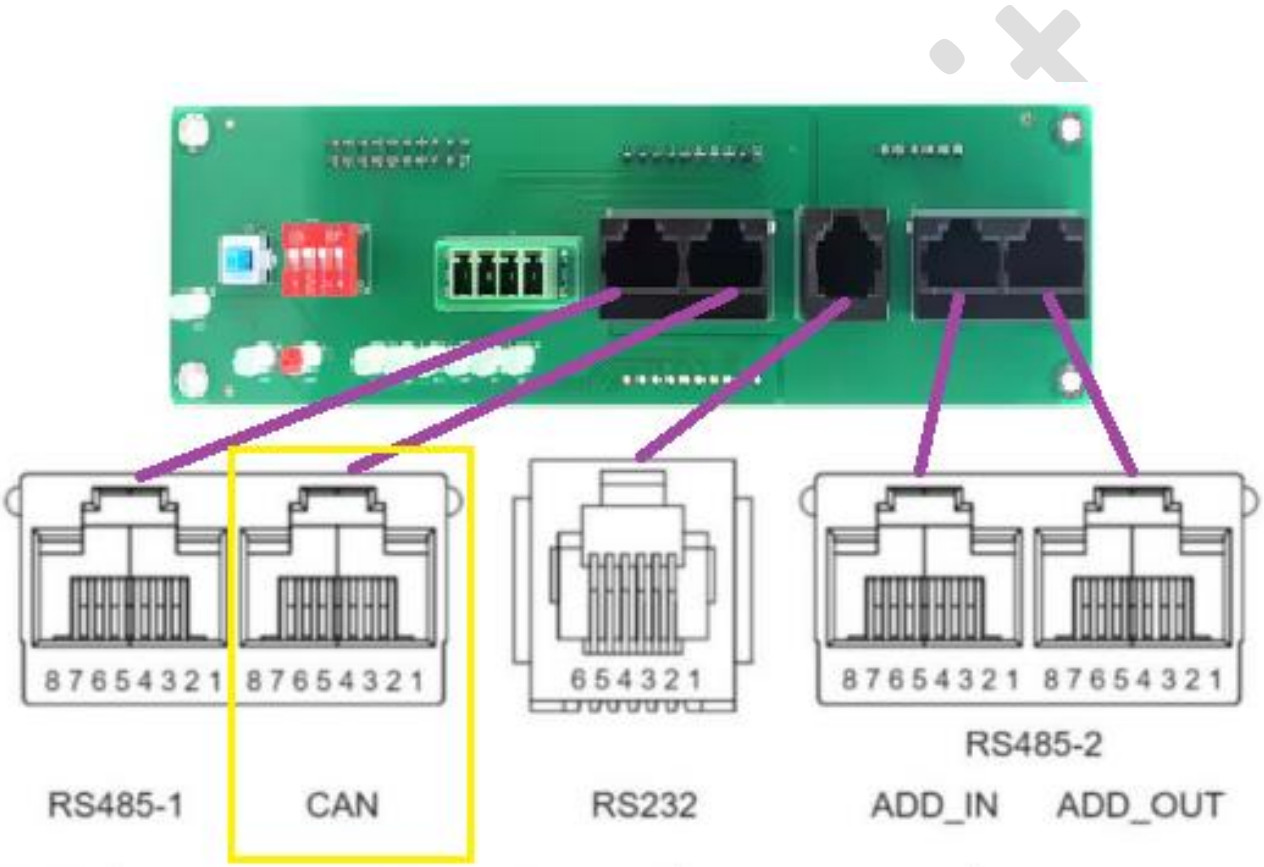

To JK-PBx BMS «CAN» PORT
RJ45
CANL 3
CANH 4
L
H
shortcut
ScanLabs SmartBMS Data Extractor for JK-PBx BMS via CAN BUS
INT
SCK
SI
SO
CS
GND
VCC
FLASH
RST
www.SmartBMS.it

JK-PBx - CAN BUS via RJ45 Wiring

On the RJ45 CAN connector we are going to use ony 2 max 3 wires :

4 -> CAN H
5 -> CAN L
3 or 6 -> CAN **GND** **

(***optional and **NOT** recommended needed only for long CAN cable)



接　口 Connector	RS485-1		CAN1		RS323		RS485-2 + 2	
功能描述 Function	连接上位机或逆变器 (Connected PC or PCS)		连接上位机或逆变器 (Connected PC or PCS)		连接上位机 (Connected PC)		并机通信 (Parallel communication) + 2	
引脚说明 Pin specification	PIN	Description	PIN	Description	PIN	Description	PIN	Description
	1、8	RS485-B1	1、8	NC	1、2、6	NC	1、8	RS485-B2
	2、7	RS485-A1	2、7	NC	3	TX	2、7	RS485-A2
	4	NC	4	CANH1	4	RX	4、5	NC
	5	NC	5	CANL1	5	GND	3	IN(L)/OUT(R)
	3、6	GND	3、6	GND			6	GND

USING NODEMCU WITH I2C OLED DISPLAY

From *ScanLabs SmartBMS data Exctractor* fw 3.3.0 , NODEMCU with OLED display is added.
Fortunately, only few Pins used by the OLED display are conflicting.
Follow the diagrams added on each session.
NodeMCU with OLED display can be bought from Aliexpress
NOTE: OLED NodeMCU cannot work with CAN transceiver

Information shown on rolling screen are :

- SOC
- Battery V & I
- Power
- Each Batteries status / Vdelta
- Clock , WiFi signal strengh
- Alarms
- **Dongle IP and Port assigned & Mdns Name**
- Active Services (Mqtt – ModBus, Notifications, Display)

YOUTUBE VIDEO : Link



SOME OLED SCREENSHOTs

On this view, all the batteries of the Battery Pack are shown. The middle point is the average reported on the top right. Bar down means that battery is below the average, bar up means that battery is above the average.
A sign + close to one battery means that battery has the highest delta mV vs the average
A sign – close to one battery means that battery has the lowest delta mv vs the average.
Batteries al listed starting from Left with Batt #1



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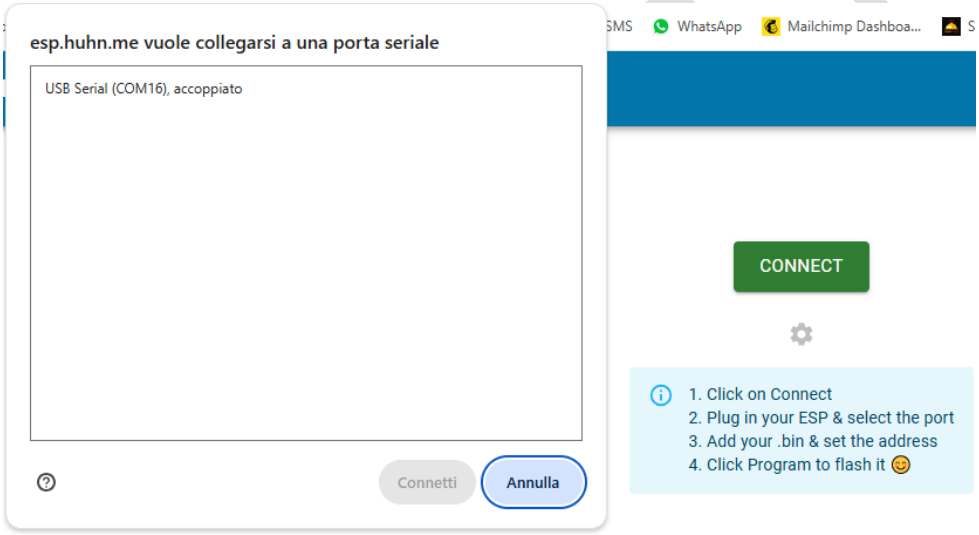
FIRST PROGRAMMING NODEMCU

There are two methods, first is for dummies and second is for dummies++
When the first method does not work use the second.

METHOD 1: PROGRAMMING NODEMCU FOR DUMMIES

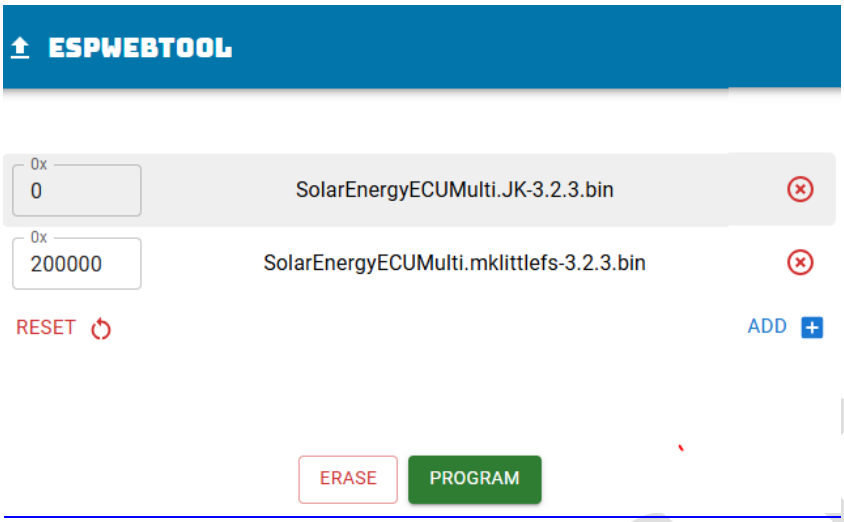
1- Go to https://esp.huhn.me/
2- Connect the dongle to PC via USB (Data Cable)
3- Click on green box “CONNECT”
4- Select the “USB Serial” port the dongle exposes.
   a. If you don’t see any COMxx, it means you are using a NON DATA USB data cable



5- Select the right FWs to load depending on your BMS

   a. SolarEnergyECUMulti.JK-3.2.3.bin at address **0x0000**
   b. SolarEnergyECUMulti.DALY-3.2.3.bin at address **0x0000**
   c. OPTIONAL** - SolarEnergyECUMulti-3.2.3.mklittlefs at address **0x200000**

NOTE: YES! If you are building a dongle for DALY you use the DALY version , if it is for JK …
NOTE: You select either for DALY or for JK
NOTE: 3.2.3 is the FW version; Always use the latest available HERE



6- Check the file Names and the Programming offset (0x0000 and 0x200000)
7- Press on "PROGRAM" -> "CONTINUE"
8- When programming is done, power cycle the dongle
9- Being the first time Dongle breathes, it will start as "Access Point" and in Factory default.
10- First step is to join the WiFi Access Point "*SmartBMS.it*", if you are lucky a captive portal will bring you directly to the first configuration page.

Follow the instruction HERE to configure the dongle.

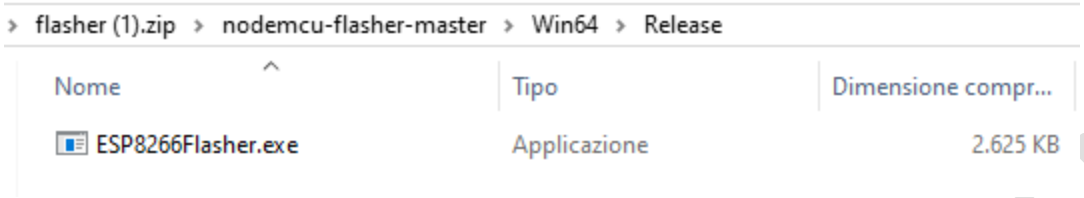
NOTE on OPTIONAL** - SolarEnergyECUMulti-3.2.3.mklittlefs
the SSBdE dongle, provides an auto-upgrade feature enabled by default. At boot time, if the dongle detects missing filesystem (aka SolarEnergyECUMulti-3.2.3.mklittlefs) it simply download it automatically from the server.

NOTE: when asked for webpages credentials:
username and password are respectively: "**admin**" and "**admin!**"

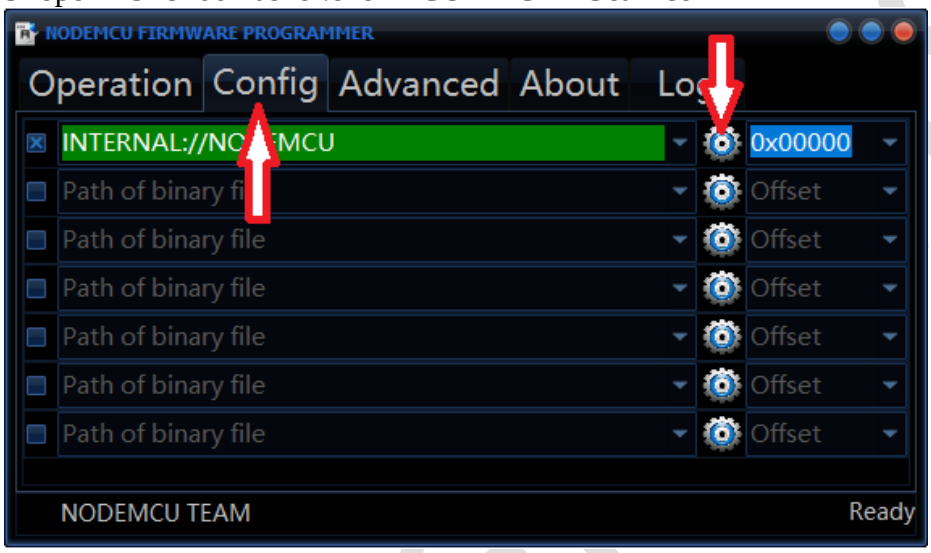
SmartBMS.it

METHOD 2: PROGRAMMING NODEMCU FOR DUMMIES++

1- download NODE-MCU-FLASHER here
2- unzip the content where you want
3- find the .exe file ESP8266Flasher.exe it is under "nodemcu-flasher-master" / Win32 or Win64



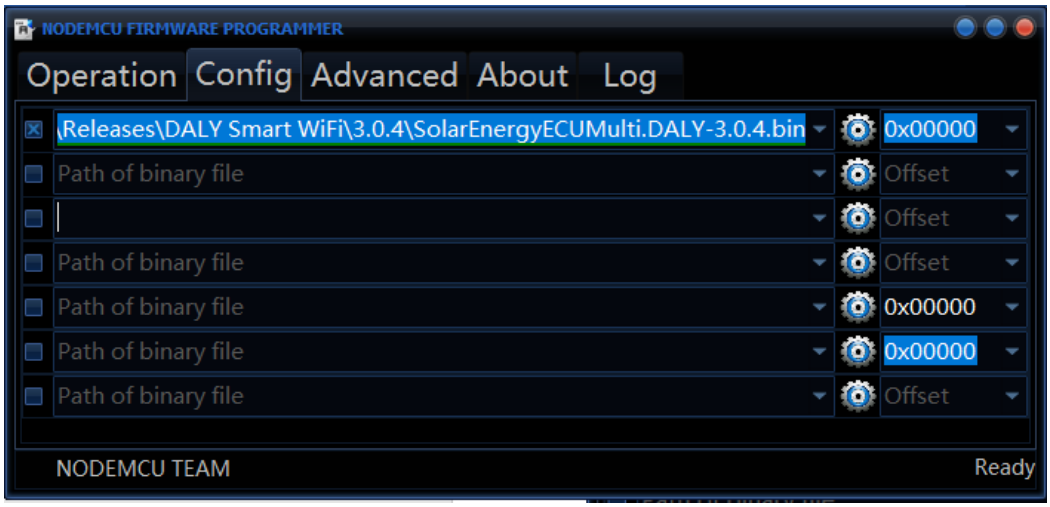
4- download the latest ScanLabs dongle FW from here
extract the zip – at this point we need only the **.bin** image
5- open ESP8266Flasher.exe -> CONFIG -> Gear Icon



6- Select the .bin file for JK or DALY/Hi – do not worry – if you are wrong at this step, you can re-flash using the right binary image.

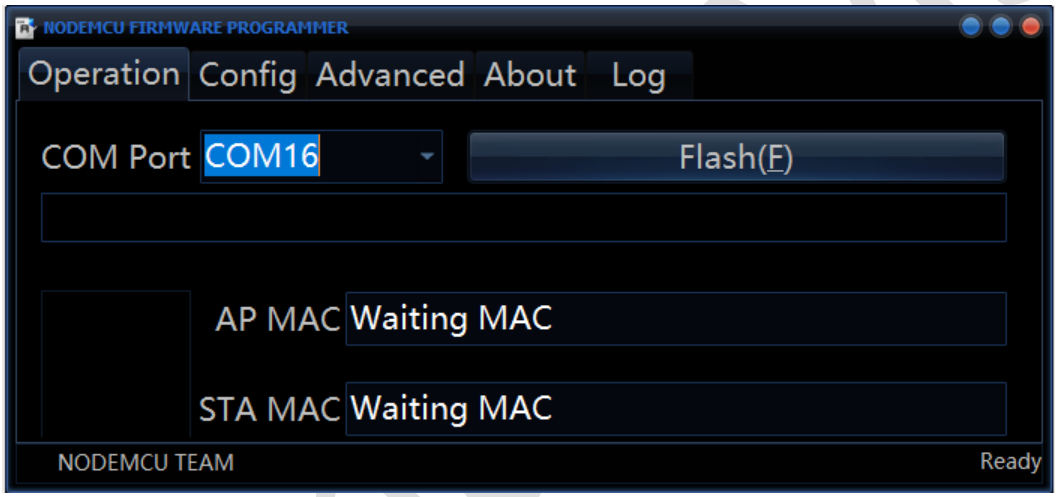
DON'T use binary images from others – I won't help further then
DON'T – DON'T – DON'T – DON'T – DON'T change 0x00000

>>>>> if you change it -> you waste the dongle <<<<<<<<<

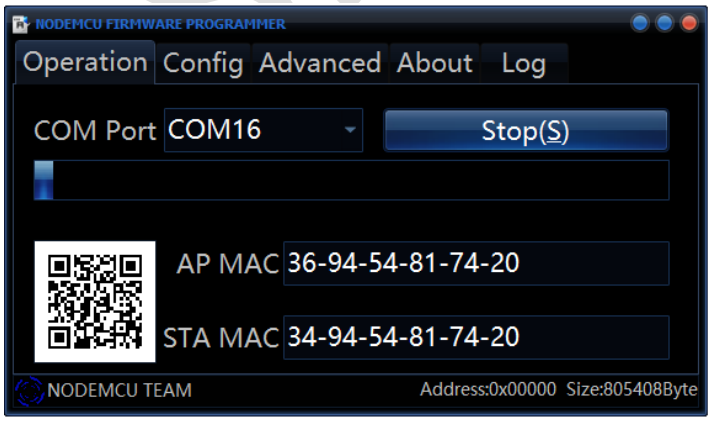


7- Go to “OPERATION”

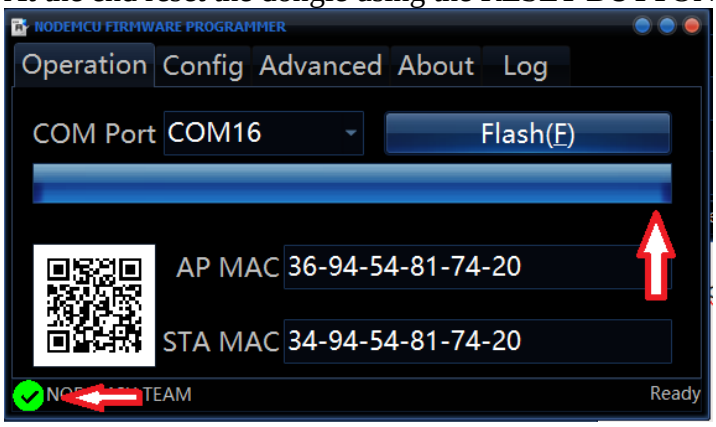
8- Select the COM port to which the dongle is connected to the PC – if NO com is listed, you don’t have the right driver installed – go to Troubleshooting and install the COM port drivers OR you are not using a USB DATA Cable.



9- This is the moment to pray – Flash procedures starts – if everything is ok you will see AP MAC and STA MAC Populated, a QR CODE and a progressing BAR



9- Dongle takes about 1-2 minutes to complete the process. WAIT until full Bar .
At the end reset the dongle using the RESET BUTTON



10- Being the first time Dongle breathes, it will start as “Access Point” and in Factory default .
First step is to join the WiFi Access Point “*SmartBMS.it*”.
Follow the instruction HERE to configure the dongle.

OPTIONAL - Upload the “web-X.Y.Z.all”** set of webpages you find in the zip file downloaded.

11- At this point you downloaded FW and Webpages . Follow the instruction HERE to configure

NOTE: when asked, default webpage username and password are respectively: “**admin**” and “**admin!**”

NOTE on OPTIONAL** - **Upload the “web-X.Y.Z.all”**
the SSBdE dongle, provides an auto-upgrade feature enabled by default. At boot time, if the dongle detects missing filesystem (aka SolarEnergyECUMulti-3.2.3.mklittlefs) it simply download it automatically from the server.

SmartBMS.it

LICENSED vs NOT LICENSED

The **unlicensed** version **is fully functional**, with only few limitations that most users will never need.

WHY? As you can imagine, building a project of this quality requires a huge amount of effort and real costs — servers, test machines, development time, and continuous improvements.

If you'd like to support this work, you can offer a coffee starting from €3.



Want a FULL LICENSE for FREE ?
Publish on your social channels , comments/experience/videos with clear and direct references to SmartBMS.it
Send me clear evidences of your post/videos with link to check via email
SHARE AND GET YOUR LIFETIME FREE LICENSE
I will thanks you with a lifetime unlock license for a given dongle ID.

Feature	LICENSE FREE	UNLICENSED
BMS Update	Polling time as low as **1s**	Polling time as low as **60s**
Battery Graphs	6 months visibility , CSV download	6 months stored but only the **current month** is visible **no CSV** download
MQTT PUBLISHER	Publish time down to **5s** **(as low as 1s via config file)**	Publish time down to **60s**
MODBUS-TCP SERVER	all registers refresh time is **1s**	full register-set Update time is **60s**
MODBUS-TCP CLIENT	all registers refresh time is **configurable**	shorter all reg Update time is **60s**
PUSH SERVICES	full featured , all daly Reports on your mobile , all failures in real time	At Sunrise/Sunset Report are sent - **no Alarms** sent
HOSTNAME	fully customizable	SmartBMS
COLOR DISPLAY DASHBOARD ID	free DashBoard ID and Name -> each remote Color Display can show up to 20 BMS even from different vendors	fixed to DashBoard ID = 1 without DashBoard Name -> ONLY one BMS can be shown on each remote Color Display
UART TUNNEL	Full featured with **120s** inactivity timeout window	Full featured with **30s** inactivity timeout window
CHARGING/DISCHARGING/BALANCING MOS MANAGEMENT	You can decide to manage them via either WEB pages or MQTT	Not Supported neither via WEB nor via MQTT
"OFFER a COFFEE"	**ICON free** on dongle webpages	Everywhere on dongle webpages

Want to try a FULL LICENSE for FOUR WEEKs for FREE ?
Request your ***four weeks free testing license*** . PUSH the "ACTIVATE" message on dongles's pages.

Want to support this giant effort with a donation ?
Full-featured SW for ONLY 3 coffees
A coffee starts at €3 — and with 3 coffees (€9) you unlock the enhanced release, including support for tighter timing requirements. **Your contribution helps me keep improving this tool**

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HOW TO CONFIGURE YOUR BMS SMART DATA EXTRACTOR

ScanLabs BMS Smart Data Extractor (SSBDE)
the following description is focused on fw rel.>= 3.6.0

It is a MUST to configure the dongle WHILE it is NOT connected to the BMS.
Power up the SSBDE via an USB cable – USB Data cable is suggested/needed.
TWO configuration methods are supported:

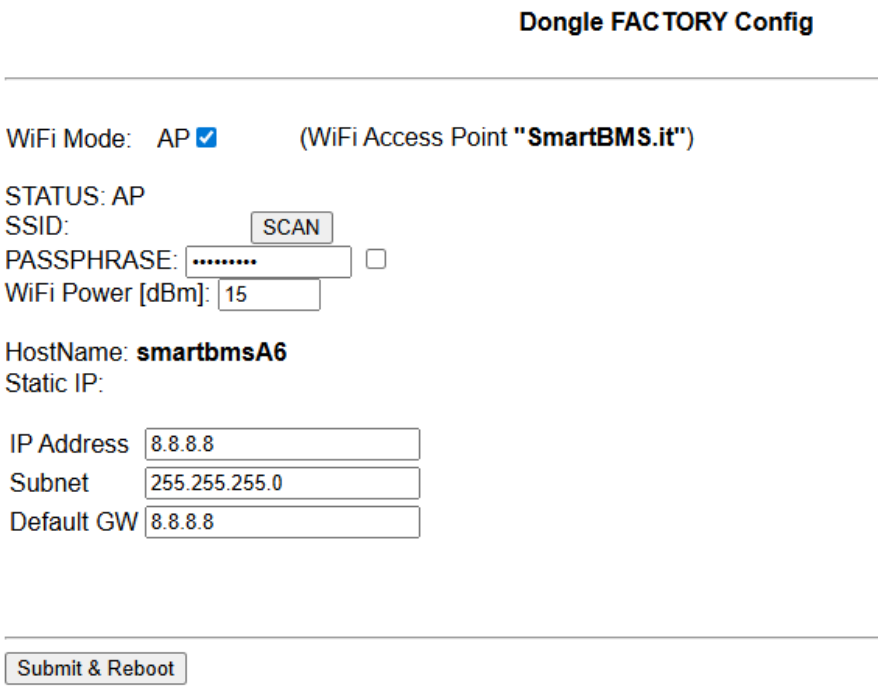
Method 1 – SETUP the dongle via WEB PAGES

ScanLabs SmartBMS data Extractor starts as ***Access Point*** after a Restore to Factory or at the very first boot. In "Factory Access Point" mode the blue-LED blinks quickly.

With your PC or Smartphone, SCAN for WiFi Access Points and connect to **SSID : "SmartBMS.it"**
No password required.

A CAPTIVE Portal should be triggered; your Smartphone or your PC should be redirect to configuration page. If this will not happen automatically, on web browser type: http://8.8.8.8/

A basic configuration page is provided for first/basic config



NOTE: if you are asked for webpage username and password use :
username "***admin***" , password "***admin!***" with a final exclamation mark "!"

ADD YOUR HOME ACCESS POINT CREDENTIALS

1. Press the "***SCAN***" button, let the dongle to Search for the Access Points in the range
2. Click on your Home Access Point Name on the list provided
    1. Automatically the SSID Name is populated and the AP flag is removed
3. Add your WiFi PassPhrase if any
    1. Note that there's a check button to hide or unhide your secrets.
4. Take note of your HOSTNAME "**smartbmsXY**" - where XY is the most important to take note.
5. Optionally and if you know what you are doing – you can FIX the IP of the dongle depending on your network setup
    1. Be sure you are selecting the right and free IP / Subnet / Gateway, being wrong here will not let the dongle to be connected to your network

-> **SUBMIT & REBOOT** to apply the new changes.

NOTE: when changing from AP (default) to Station mode, you need to verify which IP address is assigned to the dongle by your Home-Router
Follow one or more of the hereunder steps to find which IP your dongle has:

1. depending on your PC operating system / Mobile type and versions ... from your browser try **http://smartbmsXY.local** or **http://smartbmsXY**
2. on Windows/Linux DOC/Shall console type: ***ping smartbmsXY*** or ***ping smartbmsXY.local*** *(for windows this works from w11)*
3. from the AT Serial Console you can verify which IP has been assigned , the info are shown at every boot or by typing AT+STAT? (see next session for more details)
4. from your Router webpages you can verify your dongle IP searching for a wireless entity called **smartbmsXY**
5. download any MDNS APP for your mobile like "Fing" , scan the network and look for the IP assigned entity with mdns Name **smartbmsXY**

NOTE: XY after smartbmsXY vary from dongle to dongle – you must have taken it from the configuration page or from the AT Console.

NOTE:
-if hostname "***smartbmsXY***" does not work try with "***smartbmsXY.local***"
–***Windows*** support also *http://smartbmsXY* ***but only from W11++***
-iOS supports ONLY ***http://smartbmsXY.local***
-Android , only latest versions supports mDNS to resolve "smartbmsXY.local" , if you have an old version the quicker way to check the dongle IP is to open the "AT USB command"

NOTE!!! if you were wrong entering the WiFi AP Credentials you MUST switch back the dongle to **Factory mode** OR use the AT Command Mode to set the right credentials.

NOTE: if you are using a **NodeMCU** with **OLED** Display, the IP and mdns name are shown on the display

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RESTORE TO ACCESS POINT MODE

You can switch always back to Access Point mode to reconnect to the dongle and reconfigure.

This Method is NOT going to cancel your configuration, it will simply switch from STATION Mode to AP Mode. Is highly reccomended to use the AT Serial Command method to watch what is happeing.

Two methods: 1- Hardware Method, 2- Via AT Serial Commands

Hardware Method:
Push the Reset button 3 times following EXACTLY the hereunder instructions:
– After each Reset press – YOU MUST WAIT – till the BLUE LED start & stops blinking very quickly.
This is the moment to Press AGAIN the RESET BUTTON.
Repeat this process 3 Times – the dongle will switch to Access Point Mode.

AT Command console Method:
follow the instructions on "Method 2- SETUP **Via AT Commands"**
In Short, typing AT+WMODE=AP , the dongle will switch to AP mode.
Access Point Name , password, IP etc are shown on the console.

Using one of the two methods the dongle is now in AP mode:
Scanning for WiFi , you will find the AP "**SmartBMS.it**" , the password is kept the same as the one used before if any or set to default **123456789**.
Connect via WiFi and on the web broswer go to page **http://192.168.1.1 ->** move to Settings web page and apply again your settings settings.

RESTORE TO FACTORY ACCESS POINT MODE

Restore to factory will CANCEL all your configurations and set the dongle in Virgin Factory Mode

Two methods: 1- Hardware Method, 2- Via AT Serial Commands

Hardware Method:
Push the Reset button **6** times following EXACTLY the hereunder instructions:
– After each press – YOU MUST WAIT – till the BLUE LED starts & stops blinking very quickly.
This is the moment to Press AGAIN the RESET BUTTON.
Repeat this process **6** Times – the dongle will switch to Access point Mode Factory mode.

NOTE: Last less than 1 minute between pressing RESET button, otherwise the reset counter is reset and the restore to AP or restore to factory default procedure is stop.

AT Command console Method:
follow the instructions on "Method 2- SETUP **Via AT Commands"**
In Short, typing AT+WMODE=FACTORY , the dongle will be restored in factory mode.
Access Point Name , password, IP etc are shown on the console.

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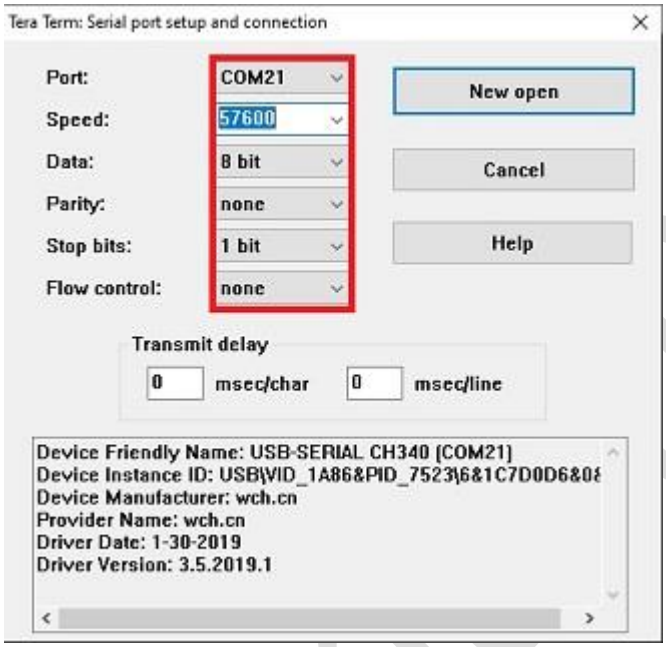
Method 2- SETUP Via AT Commands

Any HyperTerminal works – I prefer to use "Tera Term", if you have Arduino terminal this is good as well
(Tera Term ZIP rel 4.106 download from here)

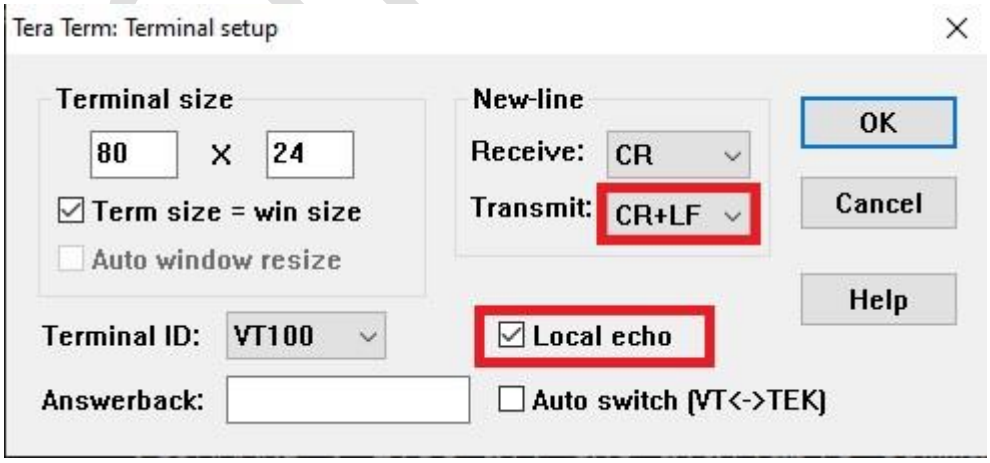
- connect the Smart BMS data Extractor Wi-Fi dongle via a USB **data**-cable to your PC
- discover which COM/TTY port is has been assigned

NOTE: If your operating system does not assign any COM/TTY port, maybe sw drivers are not installed properly OR you are using a NON USB **DATA** cable.
GO to troubleshooting page to find drivers and instructions how to install them

- Setup the Serial port: **57600,8,N,1**



- Select **Local echo** and set New-line->Transmit as **CR+LF**



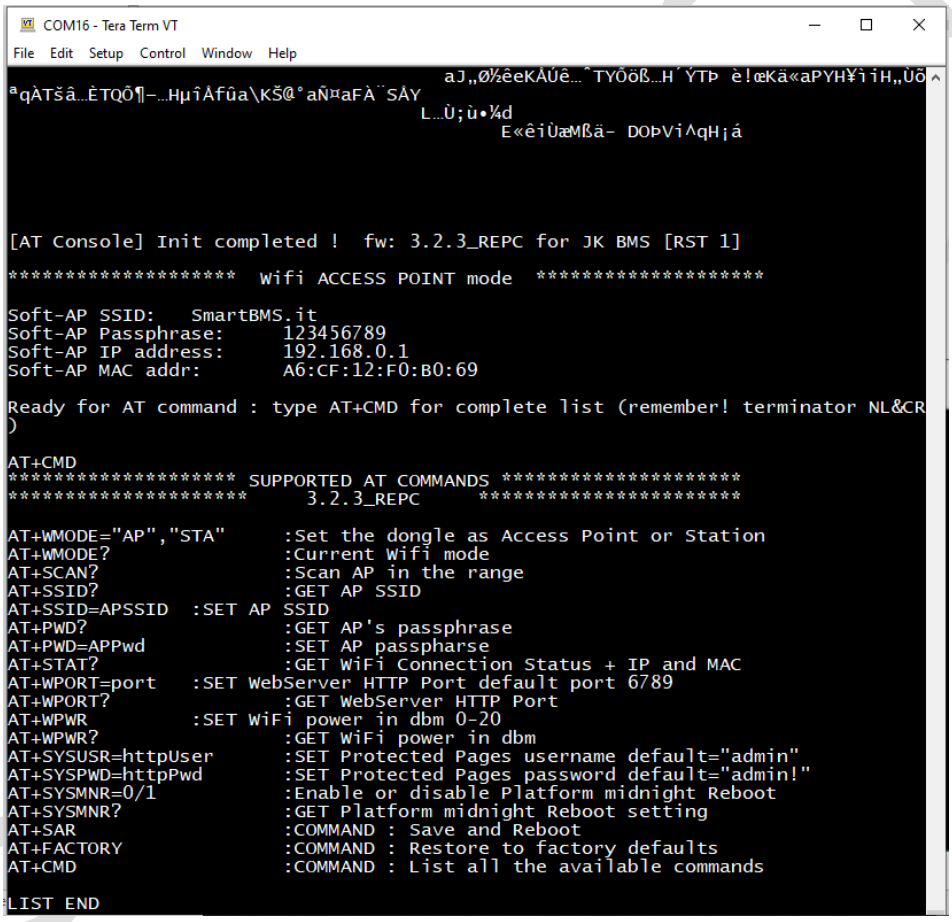
- RESET Smart BMS WI-FI accessory by pressing the button on the left as shown on the following image

- RESET Smart BMS WI-FI accessory by pressing the button on the left as shown on the image



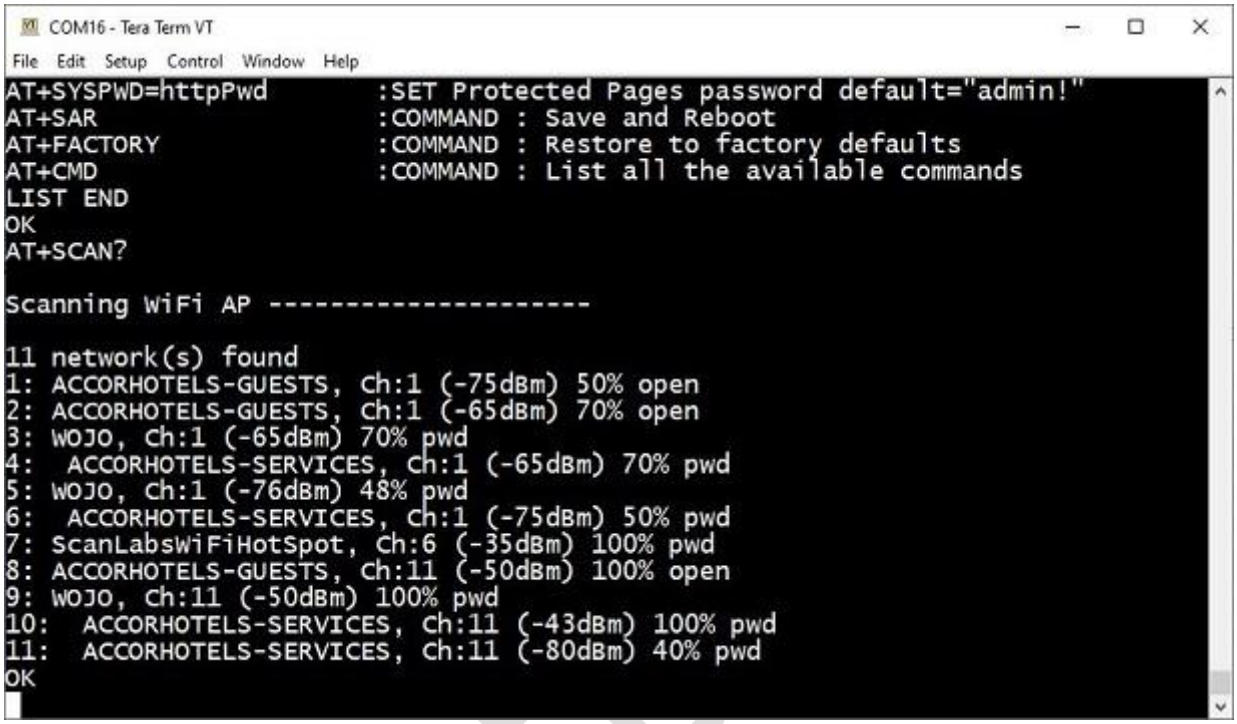
- After few seconds, on the HyperTerminal console you will see the message: “Init completed!”

- type **AT+CMD** + ENTER to access to the list of all AT available commands



SUGGESTED CONFIG PROCEDURE via AT COMMANDS

- **AT+SCAN?** -> to scan all the Access Points in the range .
  If you don't see your AP maybe it has a weak signal or it is set on 5Ghz .
  Smart BMS data Extractor Wi-Fi accessory supports 2.4Ghz AP only



- **AT+SSID=**your ACCESS POINT SSID
- **AT+SSID?** -> check you entered the right AP name
- **AT+PWD=**your ACCESS POINT PASSWORD
- **AT+PWD?** -> check you entered the right Passphrase
- **AT+WMODE=STA** -> to set dongle as Client wifi and save and reboot

OPTIONAL :
It is recommended to adjust the output power of the dongle depending on the strengthens of the Accees Point Signal, use the following table as an indication:

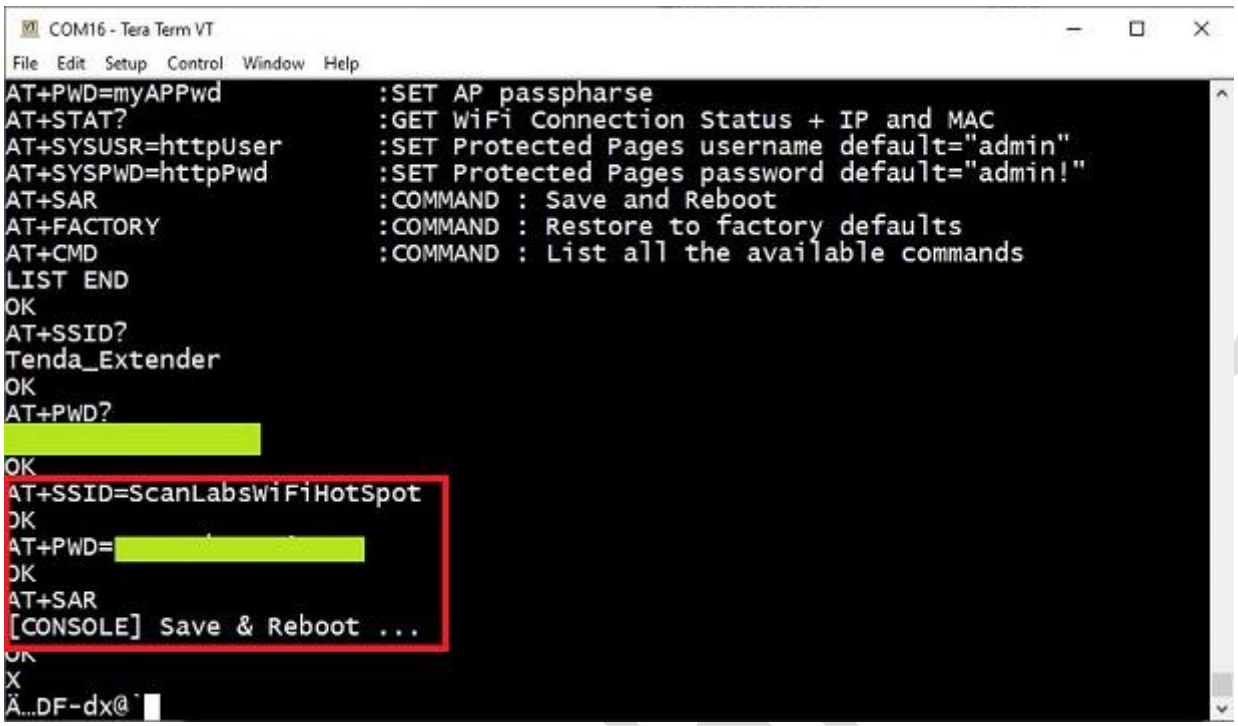
AT+WPWR :SET WiFi power in dbm 0-20 (rel >=3.6.2 a value of **127**, triggers AUTO Power tuning)
AT+WPWR? :GET WiFi power in dbm

Access Point Signal strength [%]	AT command power set
< 25	15-20
25<50	10-15
50<75	5-10
75<100	0-5 note: 0 is a suitable set

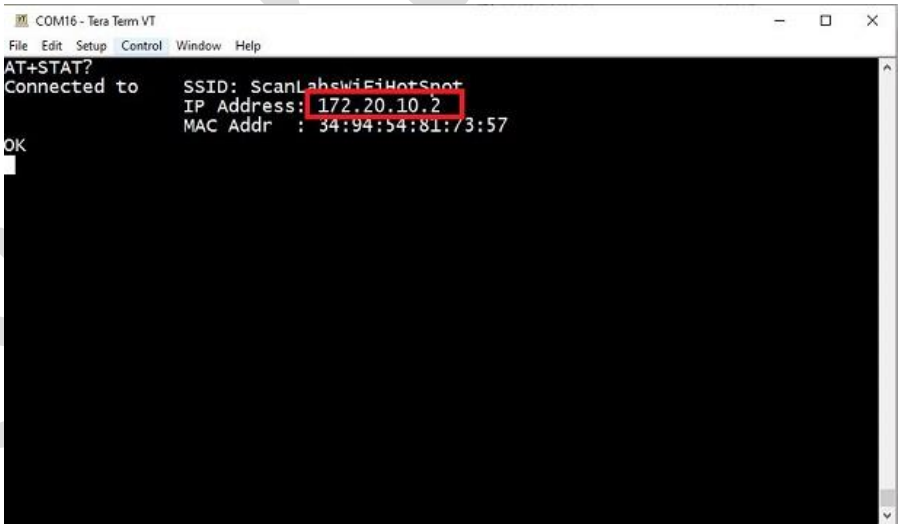
These settings can be applied before the AT+WMODE=STA command or after.
The command has an immediate effect, check if connection is stable after each setting.

NOTE: NODEMCU use an old WiFi chipset, there are some Interoperability Issues already found on the market and some limitations too

1- NODEMCU does not work well with some AP – if you experience that the only way to work around is to set the **Wireless AP in B/G ONLY mode - no N mode**.
2- NODEMCU works only with AP set as 2.4Ghz – NO 5Ghz.



- WHEN the dongle is ready for commands check the connection status
  - **AT+STAT?** -> if Smart BMS Wi-Fi accessory reports is connected, take note of the IP address assigned

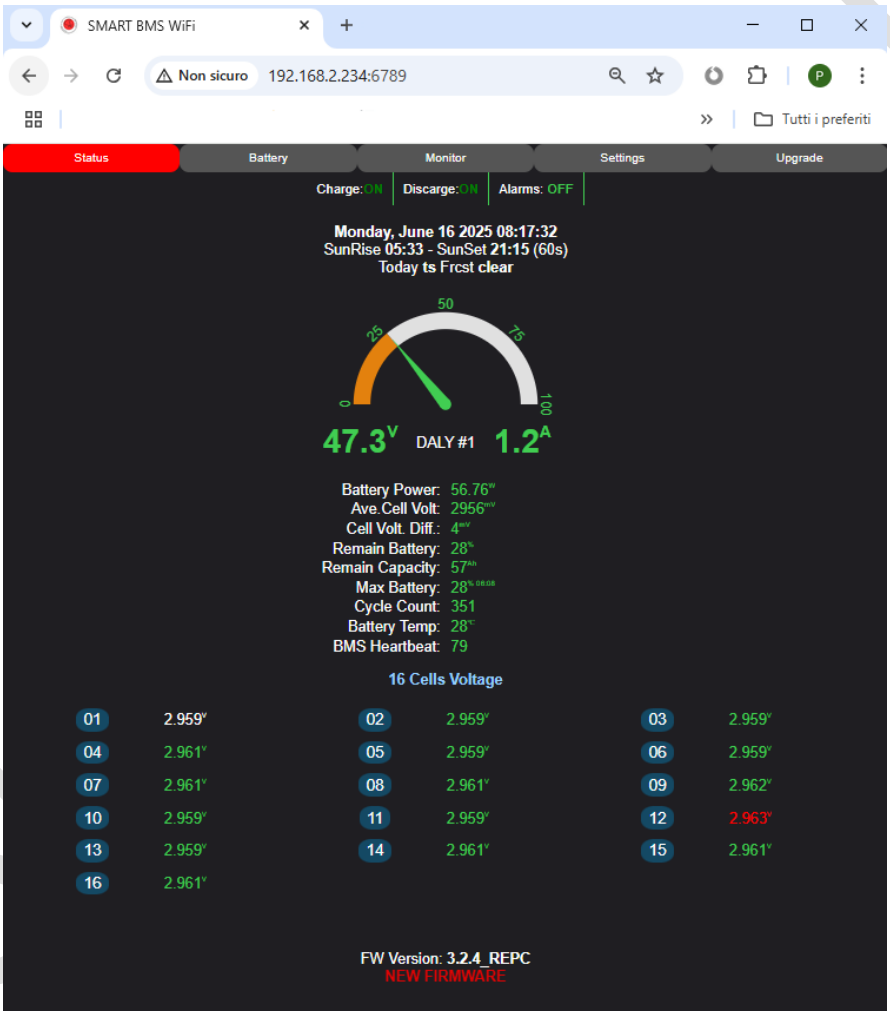


OPTIONAL 1:
The Dongle start opening a Web Page at standard port 80, you can change the port via AT command as

AT+WPORT=port :SET WebServer HTTP Port default port 80
AT+WPORT? :GET WebServer HTTP Port

If you set port = 80 you won't need to add any additional port on the URL of the dongle

- Open your preferred browser, type the IP you have just got assigned.
- ADD the needed PORT to Smart BMS Wi-Fi accessory if any
  NOTE: If you changed the Port with the procedure before, you have to set the port accordingly.
  If you have set port 80, you DON'T need to add any ":xxx" info after the IP
  ***NOTE: Since rel. 3.4.0 DEAFAULT PORT is 80**



- Now the Smart BMS Wi-Fi accessory is connected to your AP and you have the IP assigned, it's time to unplug from USB and wiring to BMS

NOTE 1: Smart BMS Wi-Fi accessory is still not connected to BMS -> you will get the message *"bms data error"*

NOTE 2: If you want to access to the Smart BMS Wi-Fi accessory from outside your home network you need to create a PORT forwarding rule on your router

Tipical port forwording setting :

External IP	External Port	Internal IP	Internal Port
ANY	6789 (or any other > 1024)	YOUR dongle IP (in my case 192.168.2.234)	80 (or the port you have assigned to the dongle)

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CONNECTING CABLES

ScanLabs BMS Smart Data Extractor (SSBDE)

- Smart BMS Wi-Fi accessory exposes 1 or 2 connectors on the TOP + USB micro or Type C at the Bottom

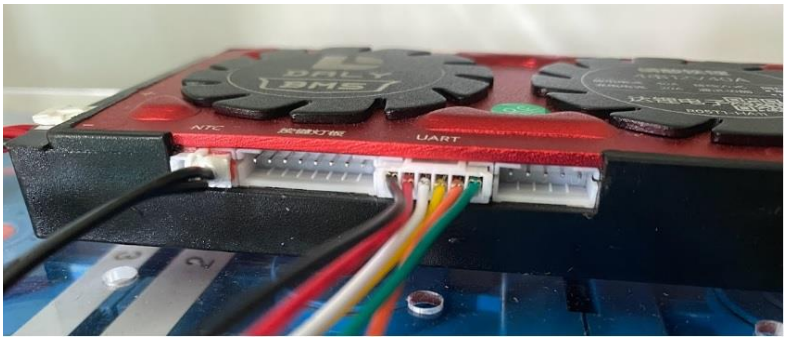


1- WIRING FOR **DALY** NEW & FORMER

- TOP of the Dongle
  - to **"BLE"** : OPTIONAL
    this is a female 6 pin connector which you can connect your DALY* Smart BMS Bluetooth LE accessory or to JK accessory like display (not available for JK-PBx via RS485 or CAN)
  - to **"BMS":** MANDATORY
    this is a male connector that goes to the BMS :
    – DALY* / Hi Smart BMS Serial Port (UART / RS232) , the same where today you connect your DALY* Smart Bluetooth LE accessory

- BOTTOM of the dongle
  - "**USB**": MANDATORY / OPTIONAL
    If you have built the dongle with internal DCDC – use USB only for configuration while it is NOT connected to the BMS
  - If you have built the dongle without internal DCDC, this is a mandatory connection to power up the dongle

NOTE: You can use a standard smartphone micro USB 5V power supply
NOTE: unplug the USB power while wiring the DALY* Smart BMS Wi-Fi accessory – when all connections are made, power the accessory via USB



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2- Hi BMS / 100Balance and DALY clones in general

Hi BMS or 100Balance are the entry level version of DALY! follow the same instructions provided for Daly
Depending on the version – you can find NEW or FORMER connector, be sure to have selected the right connector first



3- Wiring for JK-Bx & JK-PBx (RS485)

List of supported **JK-Bx** is ***HERE***

- Smart BMS Wi-Fi accessory exposes 1 on the TOP + usb on the Bottom
    - "**USB**": OPTIONAL (for JK-Bx) / MANDATORY (for JK-PBx)
      if you have built the dongle without the 100V DCDC - USB is MANDATORY to power up the dongle
      if you have built with internal 100V DCDC , DON'T use USB when the dongle is connected to the BMS !
    - to **"BMS":** MANDATORY
      this is a male connector that goes into the :
      – JK-Bx GPS (4 wire JST port)
      – JK-PBx goes to **RS485A/B** port or **CAN**

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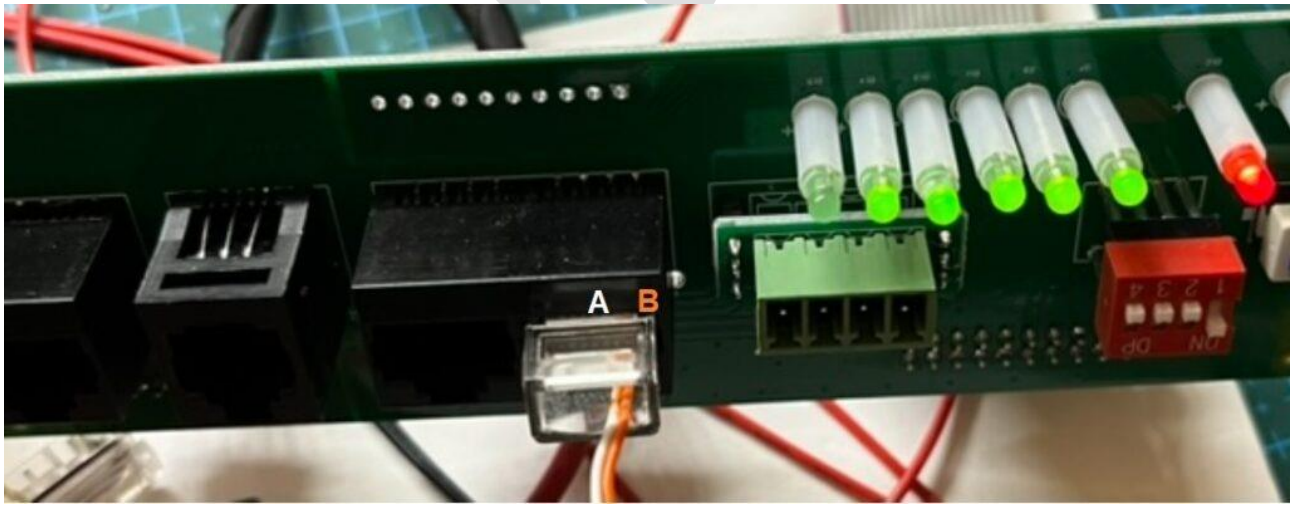
2 JK-Bx -> GPS port

NOTE: without internal DCDC - unplug the USB power while connecting the ScanLabs Smart BMS Wi-Fi accessory – when all connections are ready, power the accessory via USB

JK-PB1/2 using RS485A/B connector, the dongle MUST be powered via USB. Use the following image to locate where RS485-A port is – use the green connector as reference.



3 JK-PB1 & JK-PB2 -> RS485A – RS485B is on the other side of the panel

BROWSING WEB PAGES

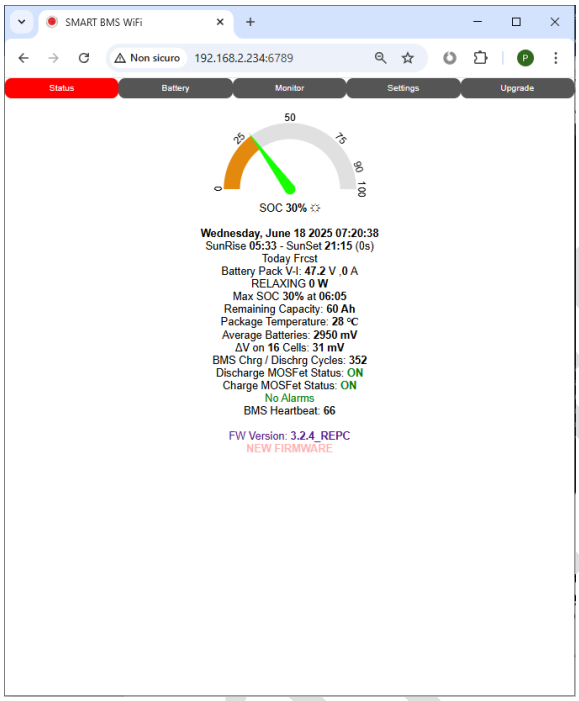
ScanLabs BMS Smart Data Extractor (SSBDE)

You can reach the data extractor dongle's webpages at:

http://smartbms.local or http://smartbms (when the dongle is in STATION MODE)
http://8.8.8.8 (when the dongle is set in Access Point MODE Factory Mode)
http://192.168.1.1 (when the dongle is set in Access Point MODE non factory Mode)

Welcome page is as follow - Simple view of your BMS data.

NOTE: There are two layouts available – DALY or JK STYLE – images below for your reference
Users can select which layout they like from “Settings” -> “Misc” -> “JK Layout”



4 DALY Style

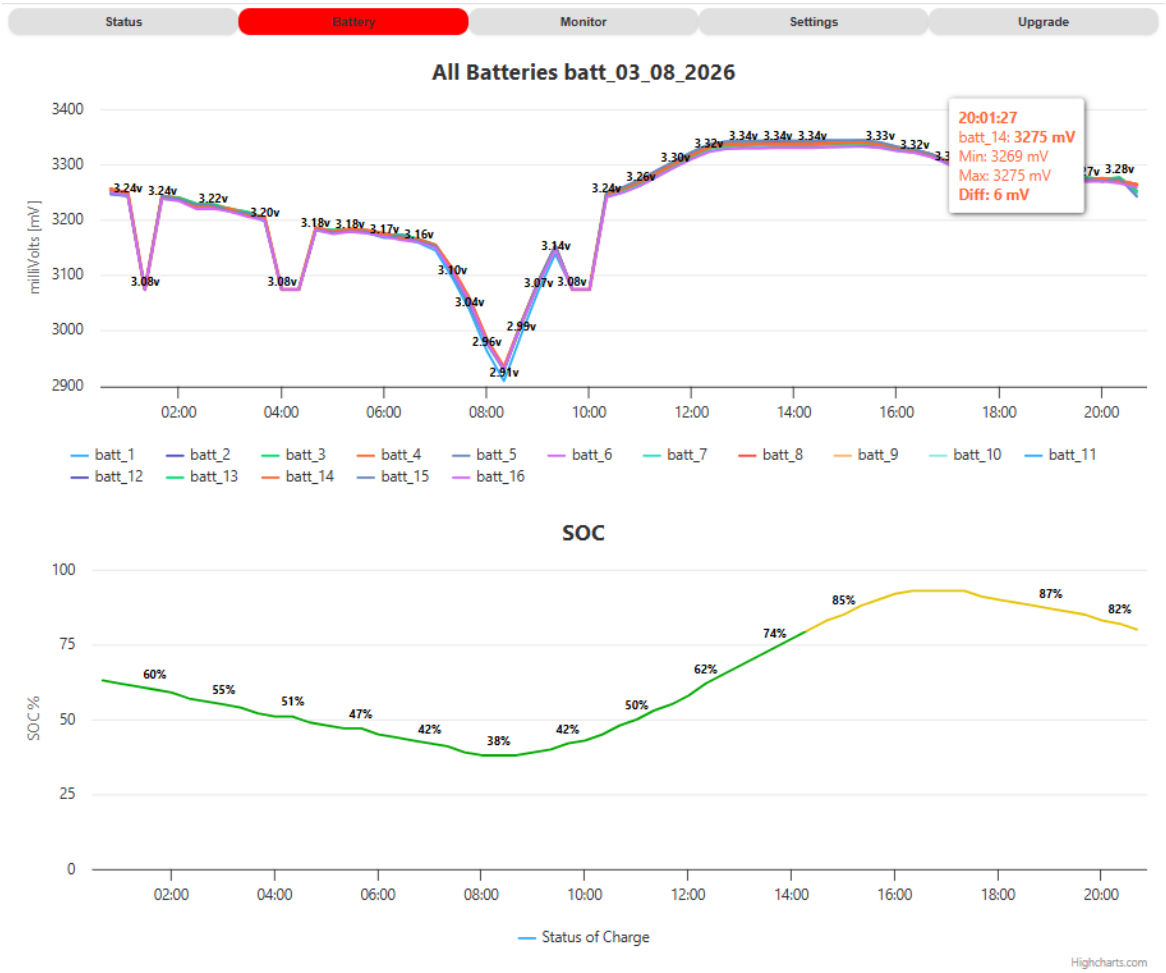


5 JK Style

NOTE: FIRST BMS data set are acquired 30s after the power up – simply wait -
NOTE: If you read “**BMS data error**” after 30s there’s a problem on the wiring to the BMS – please check your connections.
NOTE: If the BMS goes in Sleep or StandBy mode, no info can be shown – it is suggested to set the Sleep pr StandBy mode in the range of 10h – tipically enough to avoid the BMS go in Sleep Mode.

BATTERY TAB

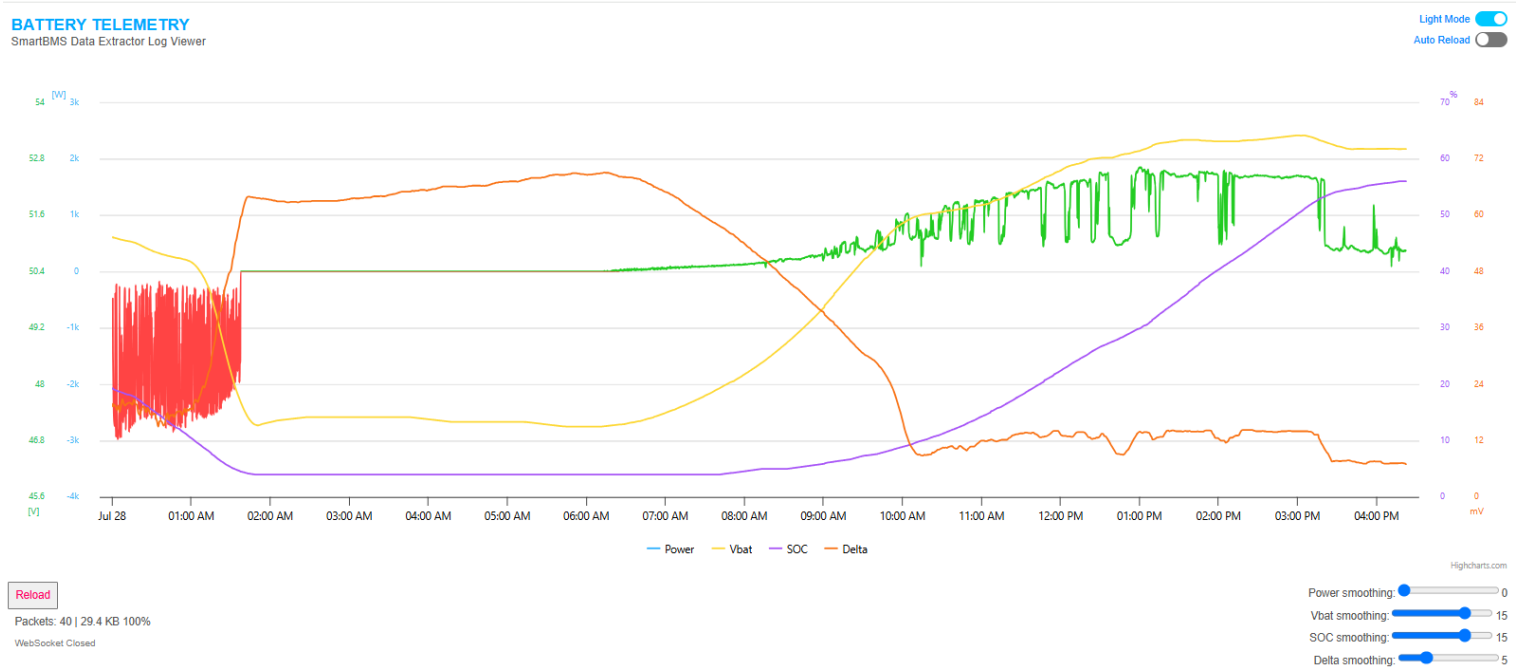
- Go to the "BATTERY" tab to watch your batteries over the last rolling 24h period
  You can **isolate** each battery simply clicking on the " batt_ " title on the bottom.
  You can **ZOOM IN/OUT** as usual to focus on critical moments



NOTE: Clicking on the Legend batt_xx , you can enable / disable the view of that given batt
NOTE: Overing the mouse on the batt you can read the status of the batt
NOTE: ZOOM IN/OUT feature available
NOTE: the graphs are populated every 20 minutes – simply wait for the first samples to be shown

MONITOR TAB

- GO to the "MONITOR" tab to watch the CHARGING-DISCHARGING phases of your battery pack over the 24h rolling period + SOC + VBAT + Delta Voltage between cells



Smart

SETTINGS TAB

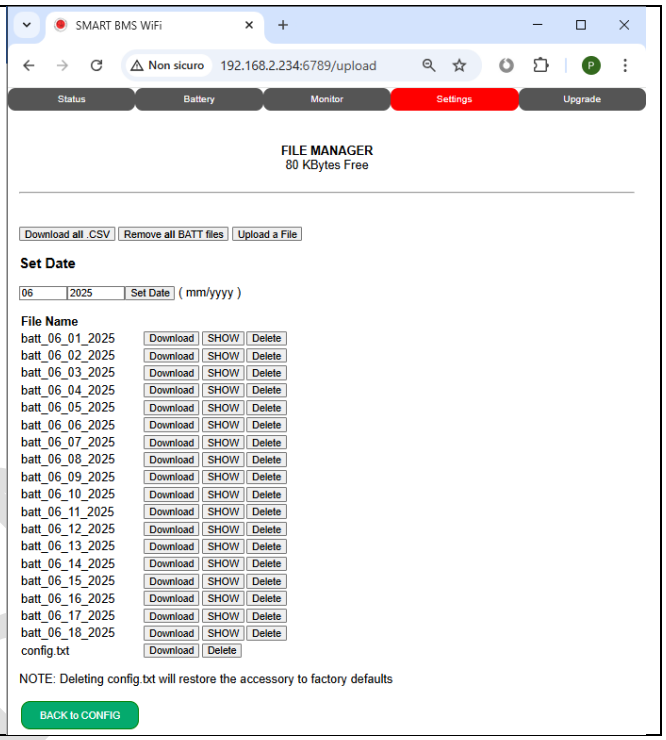
SIX MONTHs HISTORICAL BATTERY VIEW

GO to **“Settings” -> “LOG&FILES”**

- ONLY ONE MONTH is listed on the page – to change the reference MONTH simply use “SET DATE”
- You can DOWNLOAD as .CVS format
- You can WATCH with **SHOW**
- You can DELETE the file

NOTE: It is suggested to periodically Backup YOUR “config.txt” file which contains your dongle configuration.

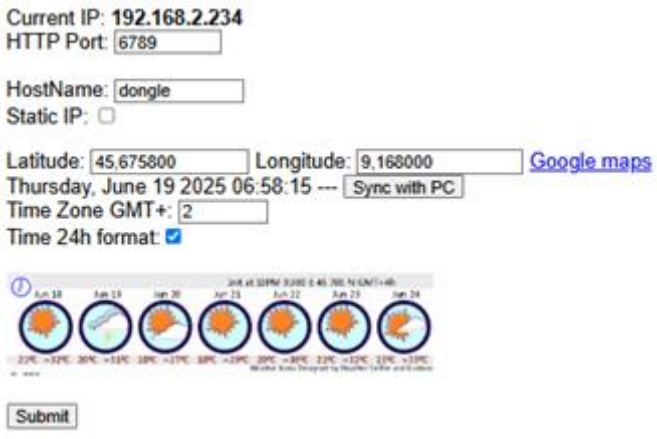
If you need to clone your dongle configuration on another one, simply download the “config.txt” file from the source and UPLOAD the “config.txt” on the new dongle.
To make the new config.txt files be effective, and hard reboot is needed = power cycle the dongle.



SmartBMS

ADDITIONAL SETTINGS

On the "***Settings***" tab you can find additional optional settings.
HostName: this is the MDSN name used to quickly PING or get access to the webpages without knowing the IP address. You can customize – this is needed when more than one dongle are deployed on the same network

	**HTTP Port:** if set as 80 – you simply type the dongle IP or the Hostname on the URL **HostName**: MDNS name used to quickly PING or get access to the webpages without knowing the IP address. Needed when more dongles are deployed on the same network **Static IP**: by default the dongle uses a dynamic IP (DHCP) – if you need static use this option. Instead of fixing IP here- I suggest to create a rule on your router . **Latitude & Longitude**: Needed to get SUN Rise-Set , Time and GMT **Time 24h**: Either 24 or 12h format if not checked

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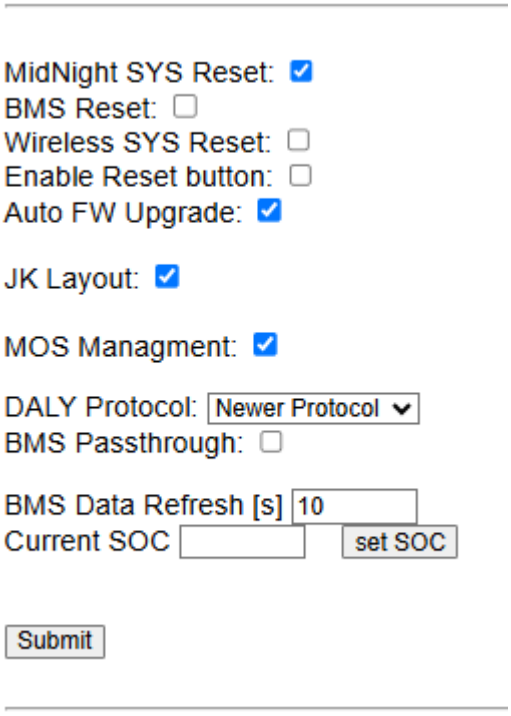
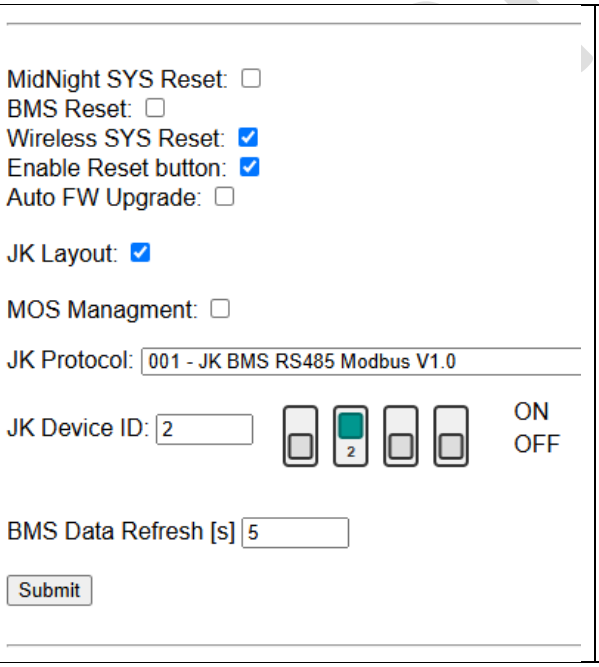
On the "***Settings***" -> "**MISC**" the are some additional settings

For Daly & Clones



MidNight SYS Reset: when checked , the dongle reboot at midnight to keep its memory fresh.
OPTIONAL – I'm not using it ;-)
BMS Reset: at each Dongle Reboot – the BMS is reset – OPTIONAL depending on your setup
Wireless SYS Reset: If WiFi connection is missing, dongle Reboots
Enable Reset button: if checked, the Reset button is used to restore to AP or restore to factory. OPTIONAL – I keep it disabled because it could happen that quick power outage can be triggered as intentional action to reset.
JK Layout: Fix the webpages following the JK layout – when not checked the layout is the DALY one.
Set MOS: Enable setting Charge/Discharge and Balance MOS from both WEB and MQTT – APP
Daly New protocol: available only for DALY users – I suggest to use this option – if it does not work you're your DALY or Clone , uncheck and test the old protocol
BMS Pass-through: Enable the pass-through feature (go to the dedicated section)
BMS Data Refresh [s]: Seconds between two consecutive BMS polling data requests.
CURRENT SOC [%]: for DALY only, set the current SOC

For JK



JK protocol: for RS485 users I suggest to use protocol 001.
JK Device ID: Must be the same you set on the BMS
BMS Data Refresh [s]: Seconds between two consecutive BMS polling data requests.

FEATURES EXPLAINED

- **MQTT SUBSCRIBER**
  - **Iot MQTT PANEL APP ->** Monitor your BMS whereever you are via MQTT
  - **VIRTUINO**
  - **HOME ASSISTANT ->** Link your BMS to your Home Assistant platform

- **PASSTHROUGH**

- **UART TUNNEL aka Virtual TUNNEL**

- **MODBUS TCP**
  - **SERVER**
  - **CLIENT**

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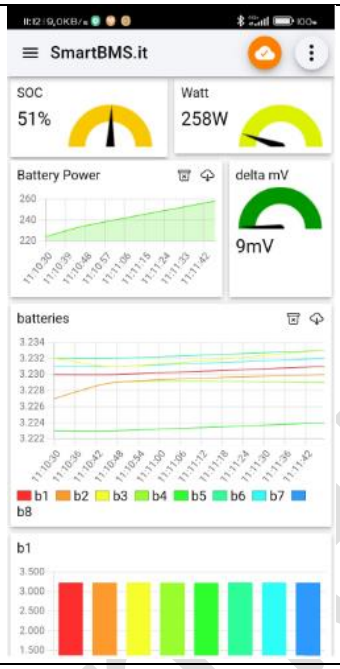
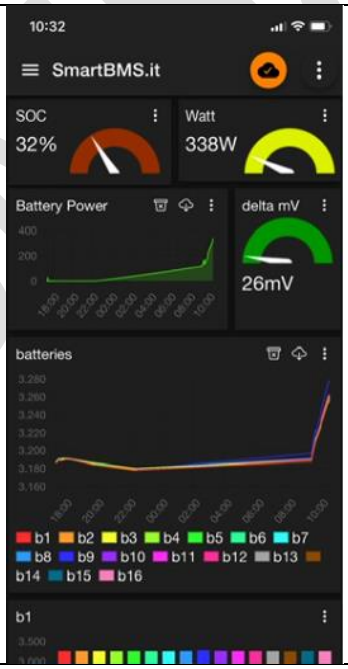
CONFIGURE MQTT

TARGET: Use a nice SmartPhone APP to watch your Battery(s) pack data wherever you are in the world

The ***ScanLabs Smart BMS Data Extractor*** export a configuration-file ready to be imported into the **IoTMQTT Panel** mobile APP – to grant an almost ZERO config experience.

What you will enjoy on your mobile Android or Apple is shown on the images below.

NOTE: you can customize the layout as you whish – this is a simple example -
NOTE: Via MQTT and apps like IoT MQTTPanel you can COMBINE multiple battery packs in only one global view

DASHOBOARD THEME COLOR WHITE	DASHOBOARD THEME COLOR BLACK
	

Download the IoTMQTT Panel app on your SmartPhone – check if your phone is compatible
To download the app go to your reference Store, the app is available for both Android and IoS
Developer's website is www.snrlab.in
The app currently does not require any payment or registration to work properly.

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CREATE AN ACCOUNT WITH BROKER MQTT PROVIDER

NOTE: Beginning 01/01/2027 HiveMQ Serverless plan will not be available any longer.

I keep on this manual the instructions how to configure HiveMQ while I suggest to create an account at **EMQX**: go here https://www.emqx.com/en/pricing

EMQX – "Serverless" plan for non professional users.
It is far more than what we need to monitor our BMS, it is free … so we like it !
So far tested with up to 20 Battery packs in parallel publishing data every 10s.

NOTE: EMQX, HiveMQ are examples – if you are an HOME ASSISTANT user, you can install Mosquitto and use your personal MQTT broker. Up to you !

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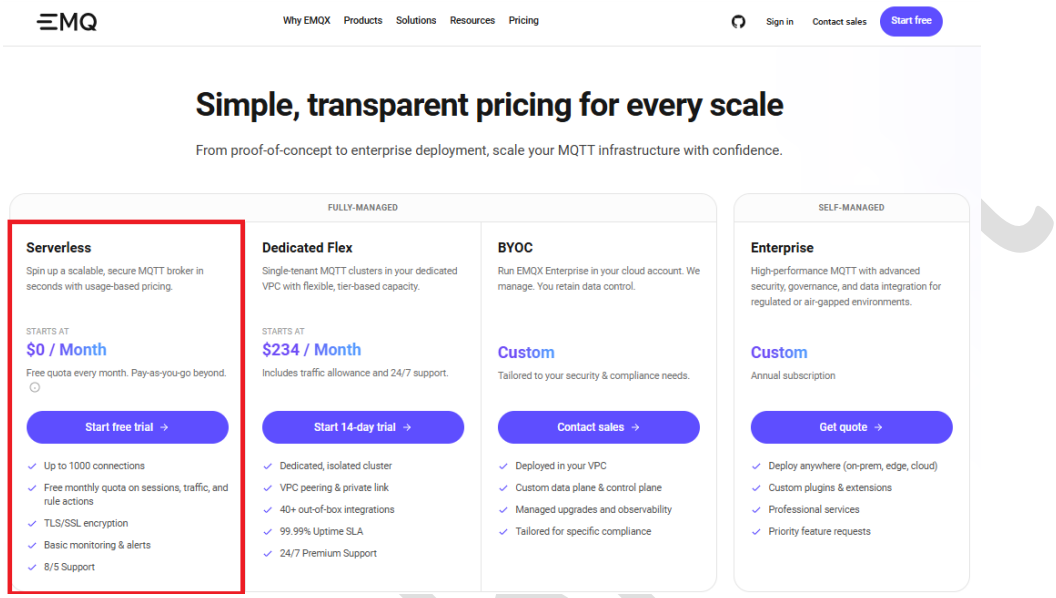
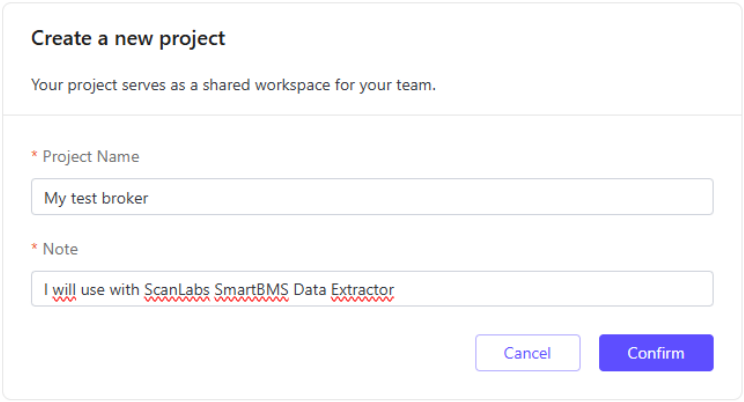
SETUP MQTT BROKER EMQX

SETUP an EMQX Serveless Account

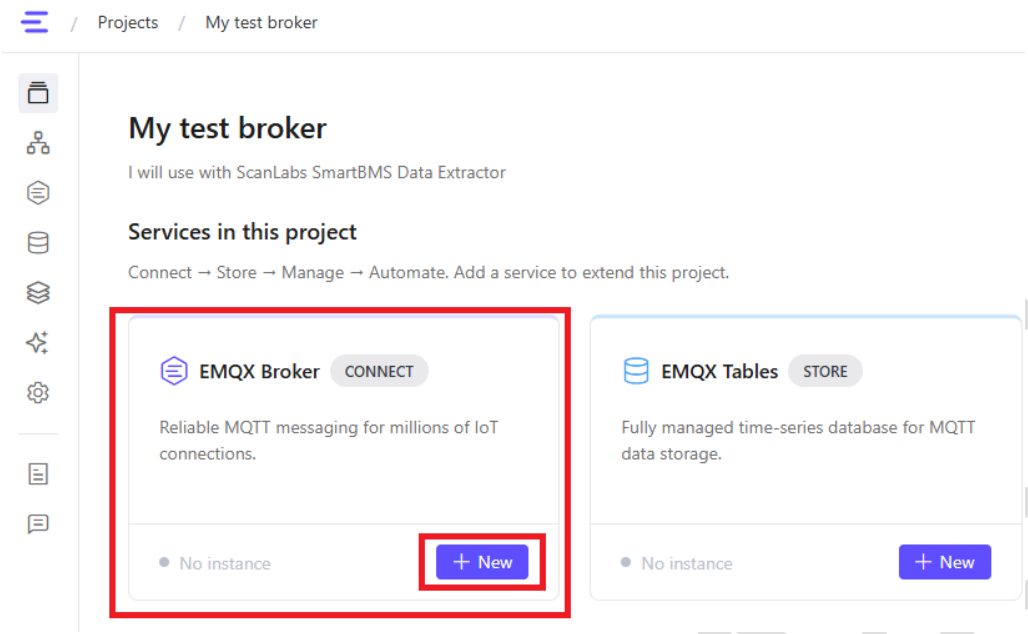
1- GO to link: https://www.emqx.com/en/pricing
2- Select – ***Serverless*** plan
3- Login or create an account



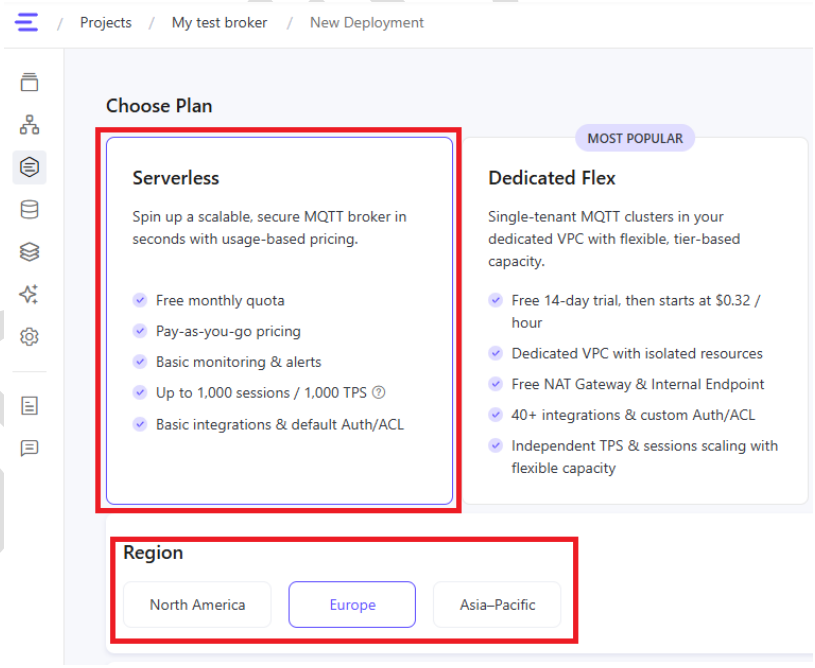
Create a *NEW PROJECT*



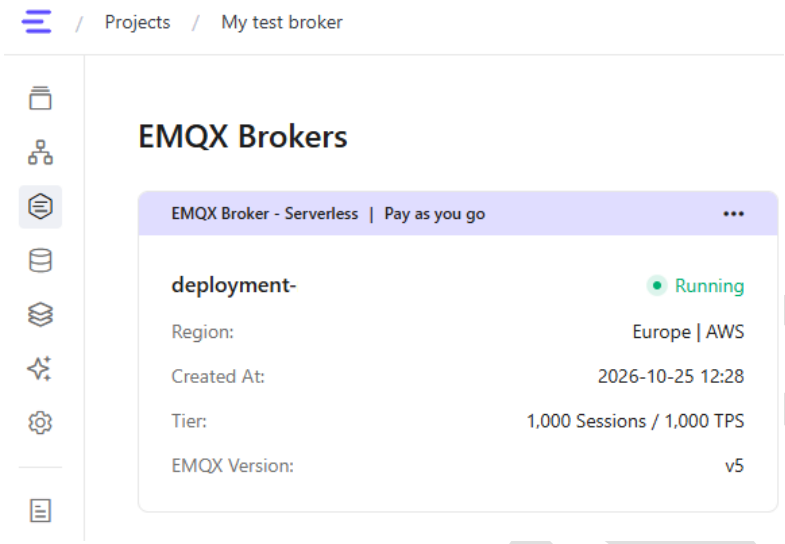
Create a *NEW EMQX Broker*



Choose *Serverless* and select your Area & DEPLOY your Broker



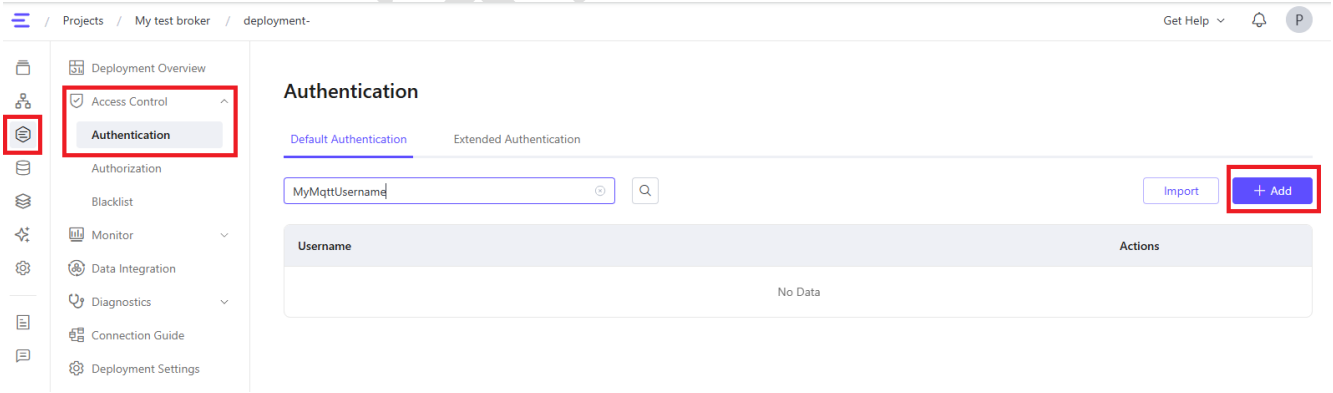
Your Serverless Broker is reported as “Running”



Setup one or more accounts

1- Top left Icon -> “Project Overview”
2- Under Deployment -> Select your EMQX Broker Project
3- Access Control -> Authentication -> enter a Configuration Name
4- +ADD -> define mqtt Account USERNAME & PASSWORD

NOTE: Take note about USERNAME and PASSWORD, which are the one you have to add into the SSBdE Settings->MQTT page



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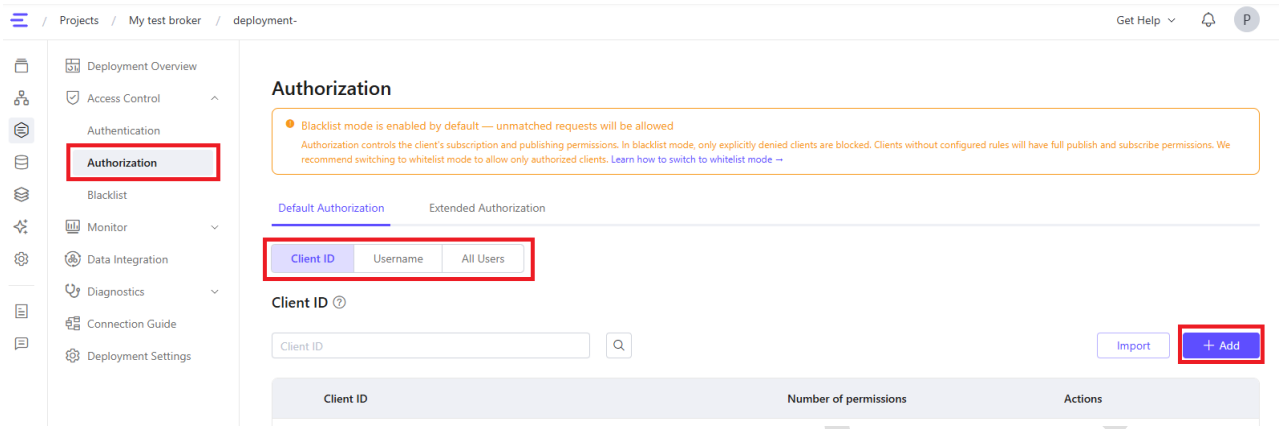
OPTIONAL – add Authorization

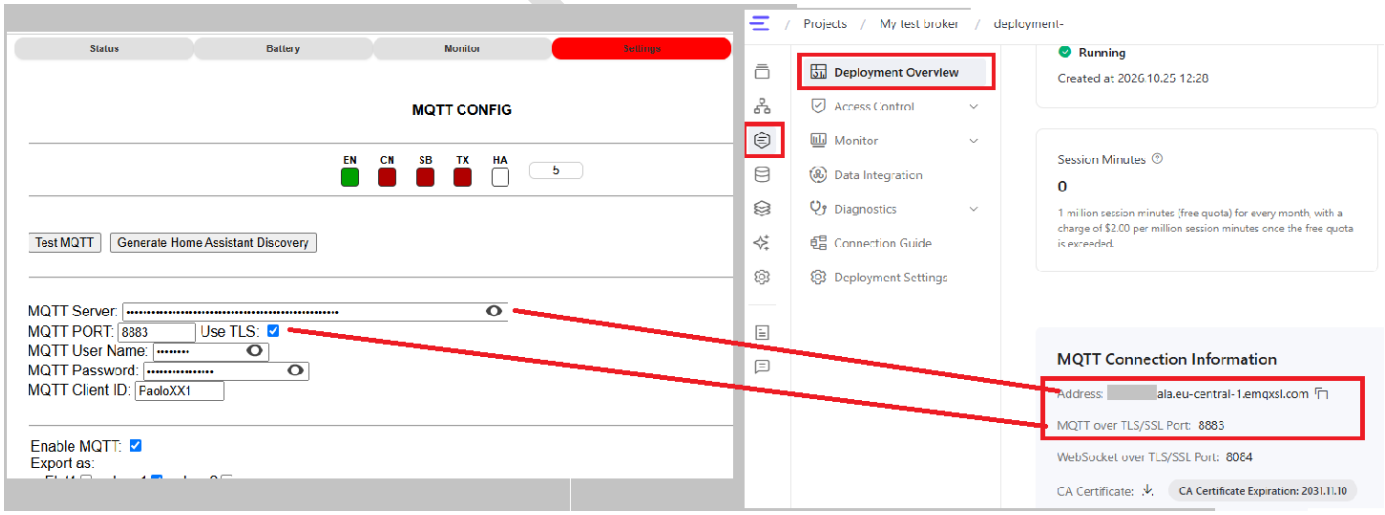
Whether you need to restrict access to this Broker , you can use this menu.

1- Restric access by Client ID or Username – define Subscribe / Publisher rights



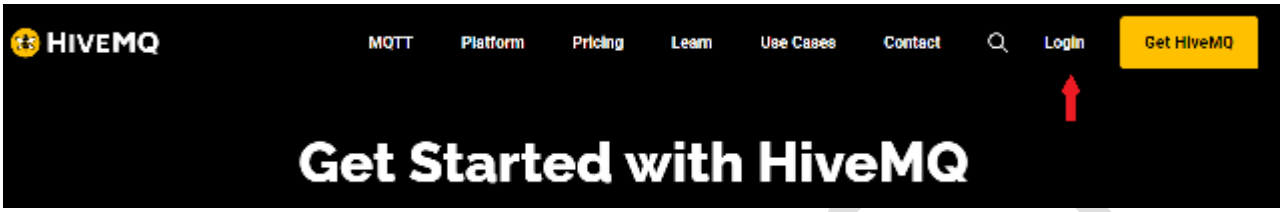
CONFIGURE SSBdE :

1. Copy Address into MQTT Server
2. Set MQTT PORT to 8883 and check Use TLS
3. MQTT User Name is the Username you selected before
4. MQTT Password is the Passowrd you defined steps before
5. MQTT Client ID you can invent. MUST be unique for every SSBdE
6. Check Enable MQTT
7. PUSH Submit at the bottom of SSBdE->Settings->MQTT page
8. PUSH on button Test MQTT
    a. EN led must be green
    b. CN should become green whether your settings are all good

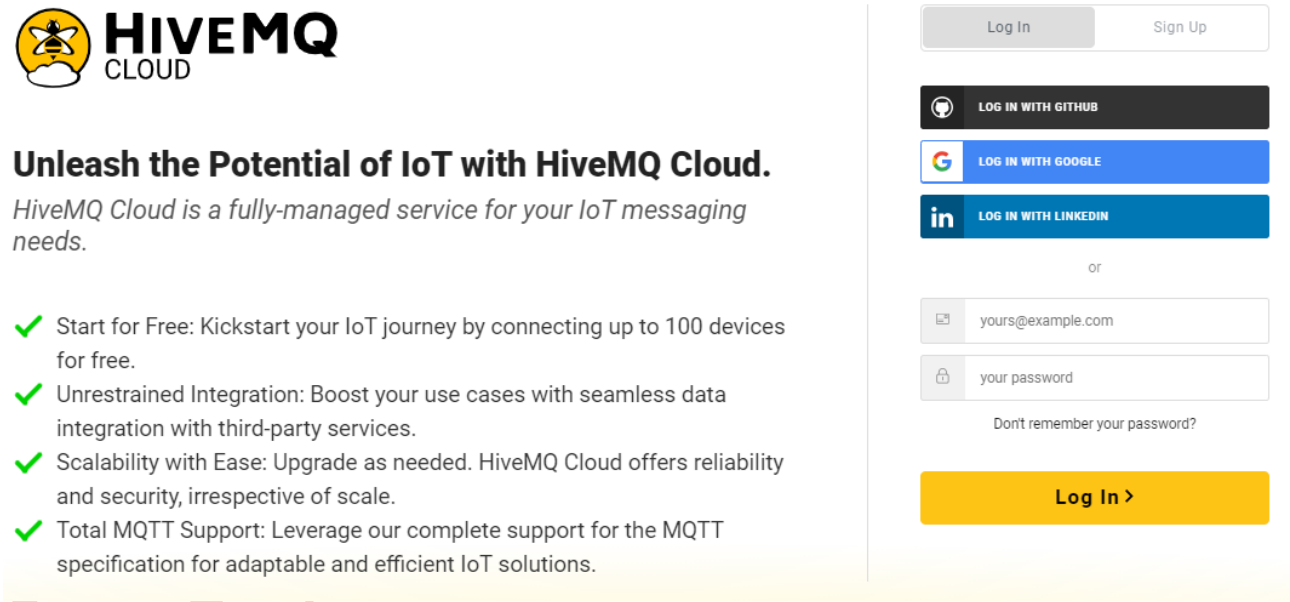


SETUP an HiveMQ Serveless Account

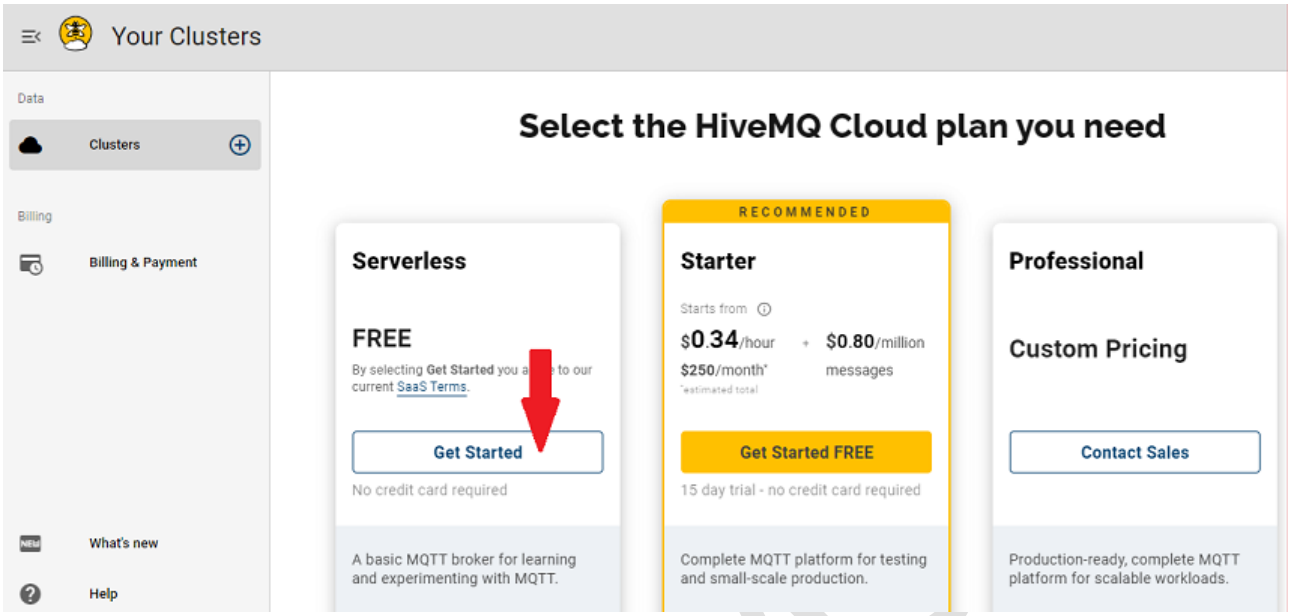
5- GO to link: https://www.hivemq.com/products/mqtt-cloud-broker/
6- "**Login"**



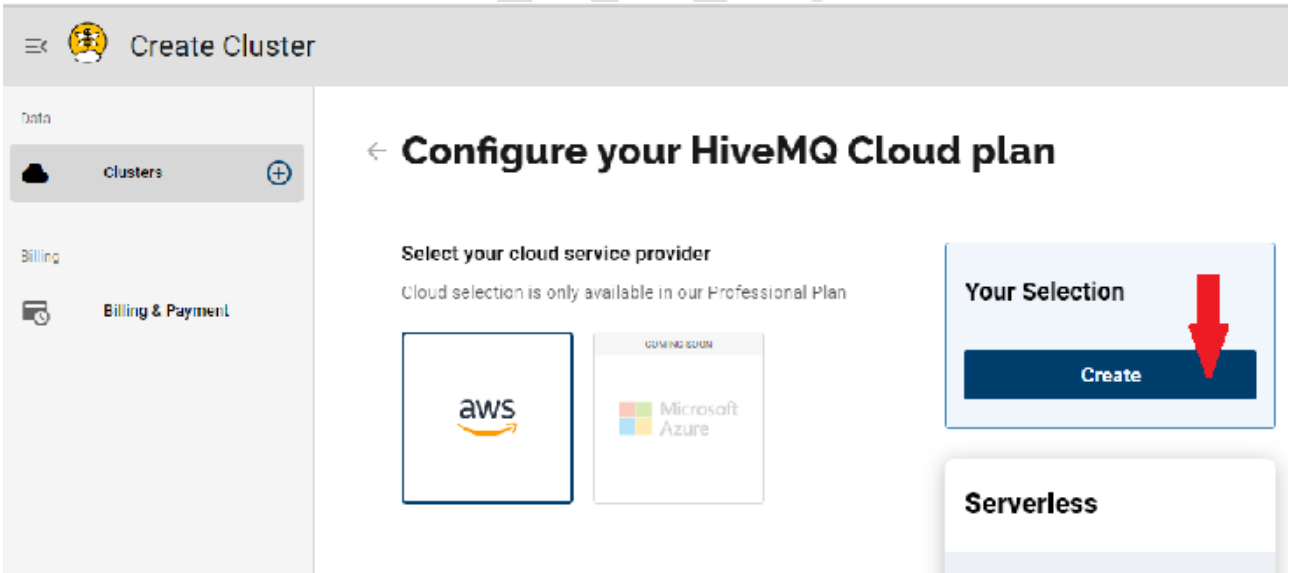
7- "Login" or "Sign Up"
LOG IN WITH GOOGLE is straight forward.



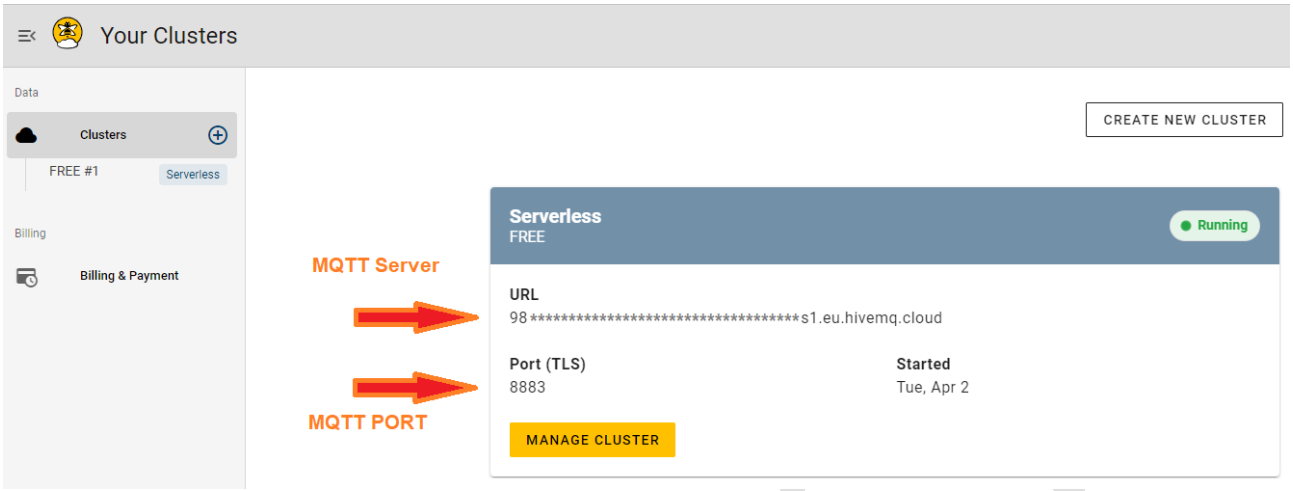
8- Select the “Serverless FREE” plan -> click on “Get Started”



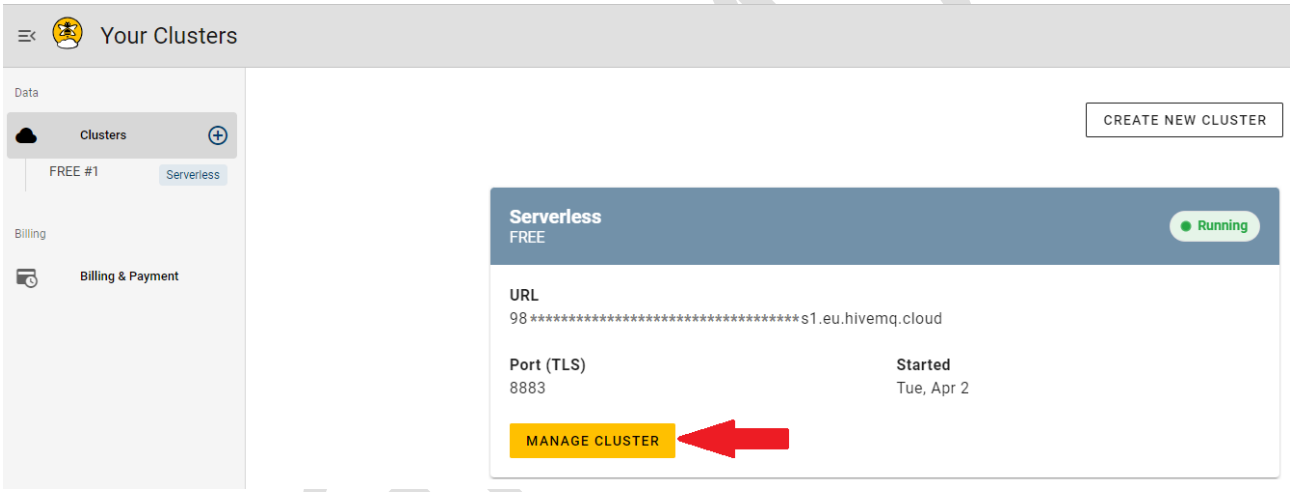
9- Click on “CREATE”



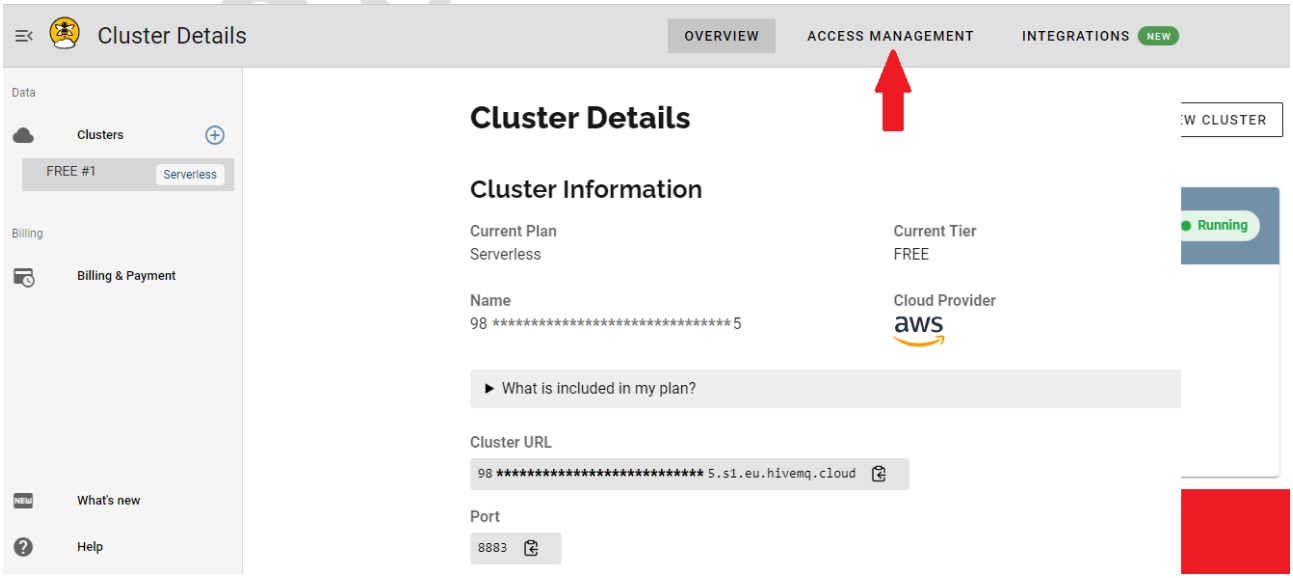
10- Take notes about ***"MQTT Server Name"*** and "***MQTT Port***"
We will use those info to setup the dongle.



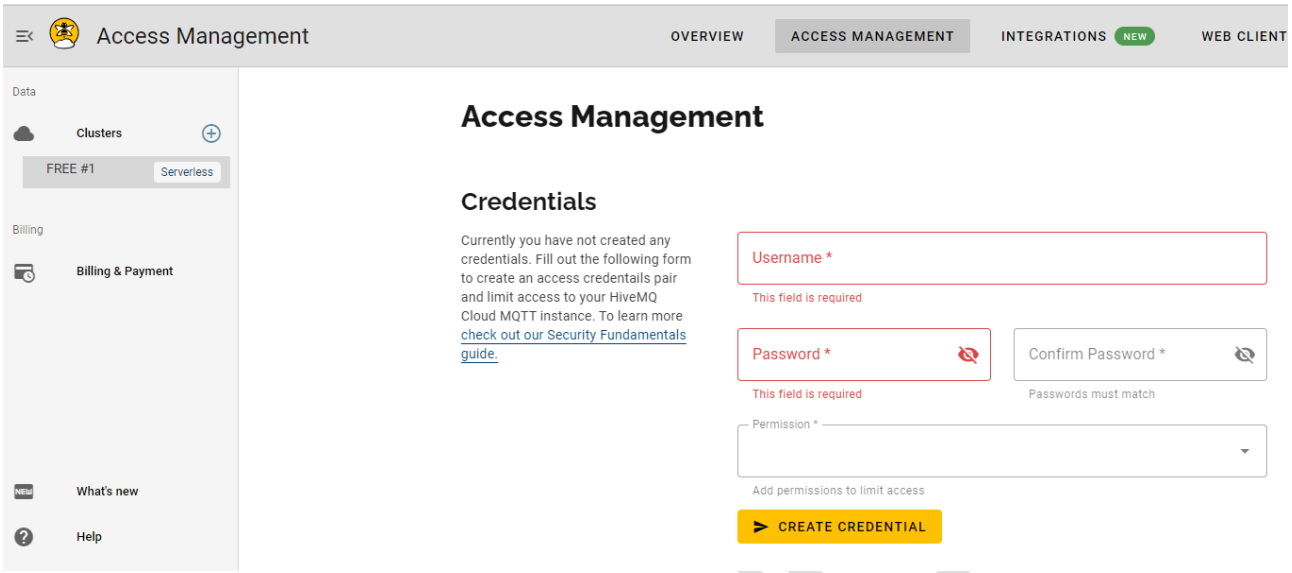
11- Click on "MANAGE CLUSTER"



12- Click on "ACCESS MANAGEMENT"

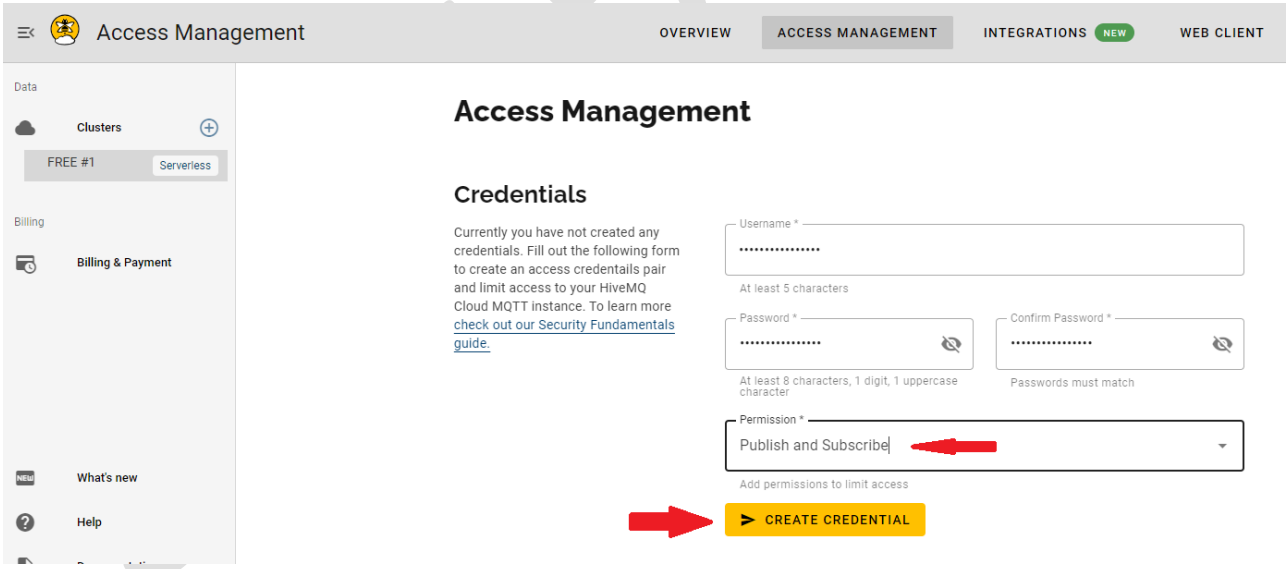


13- Set your own credentials for this MQTT server
– USERNAME e PASSWORD will be used to set the ***ScanLabs Smart BMS data Extractor***

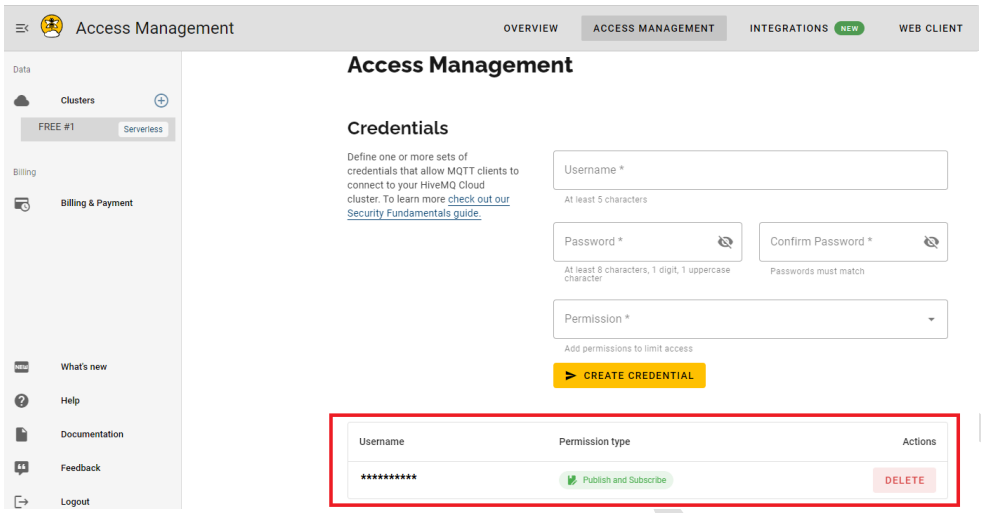


14- On field “PERMISSION” , select “***PUBLISH and SUBSCRIBE***”

15- Click on “CREATE CREDENTIAL”



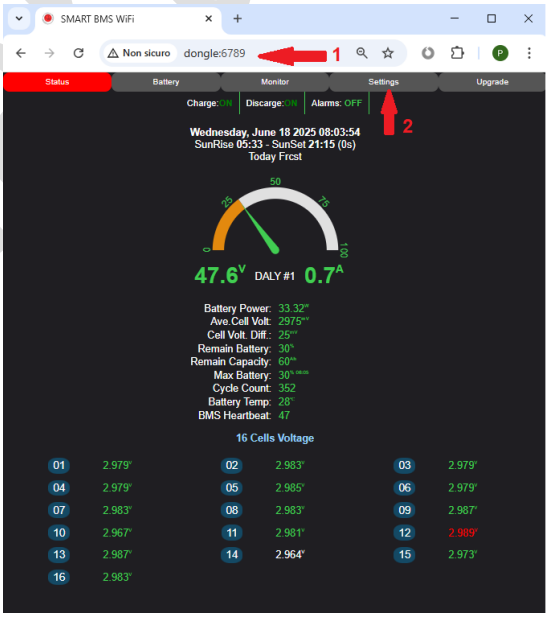
16- Check the just added credentials are active – if they are, they will be shown on the bottom of the page



AT THIS POINT YOU ARE DONE WITH HIVEMQ BROKER SETUP

NOW LET's WORK ON THE "ScanLabs SMART BMS DATA EXTRACTOR"

17- Go to your dongle's web page go to -> ***"Settings"*** TAB
http://smartbmsXY or http://smartbmsXY.local or by typing the dongle IP.
NOTE: change the MDNS name if you have customized it via AT Commands or Webpages –
NOTE : in the following image you can notice I changed from MDNS default name "***smartbms"*** to "***dongle"*** and added a port 6789



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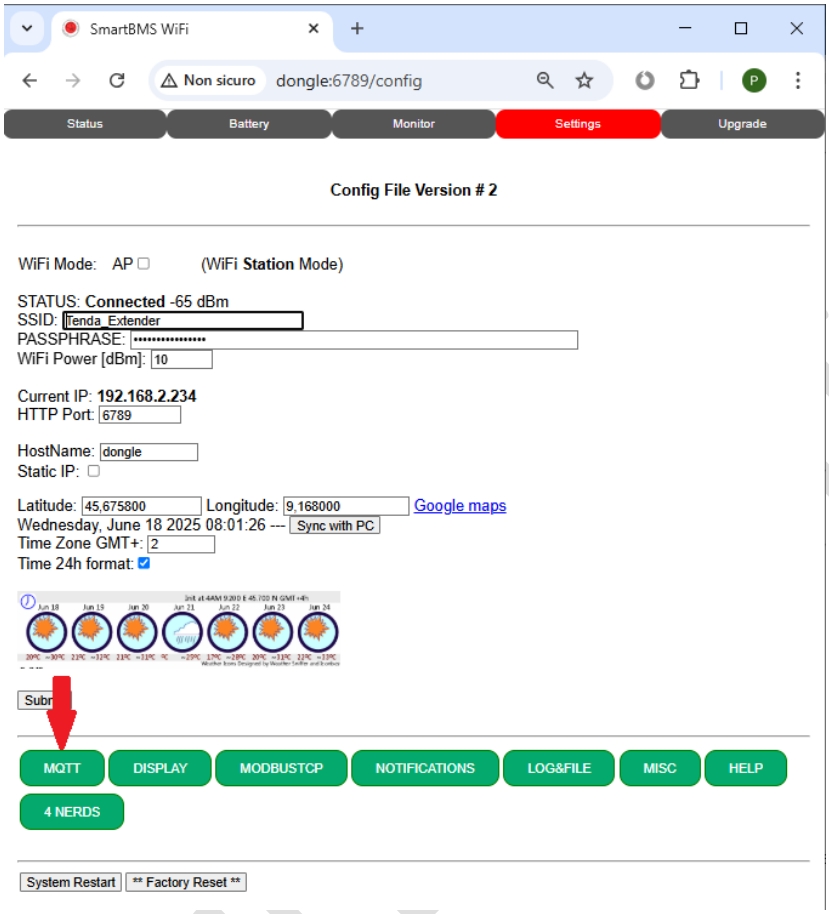
18- Click on "***MQTT***"

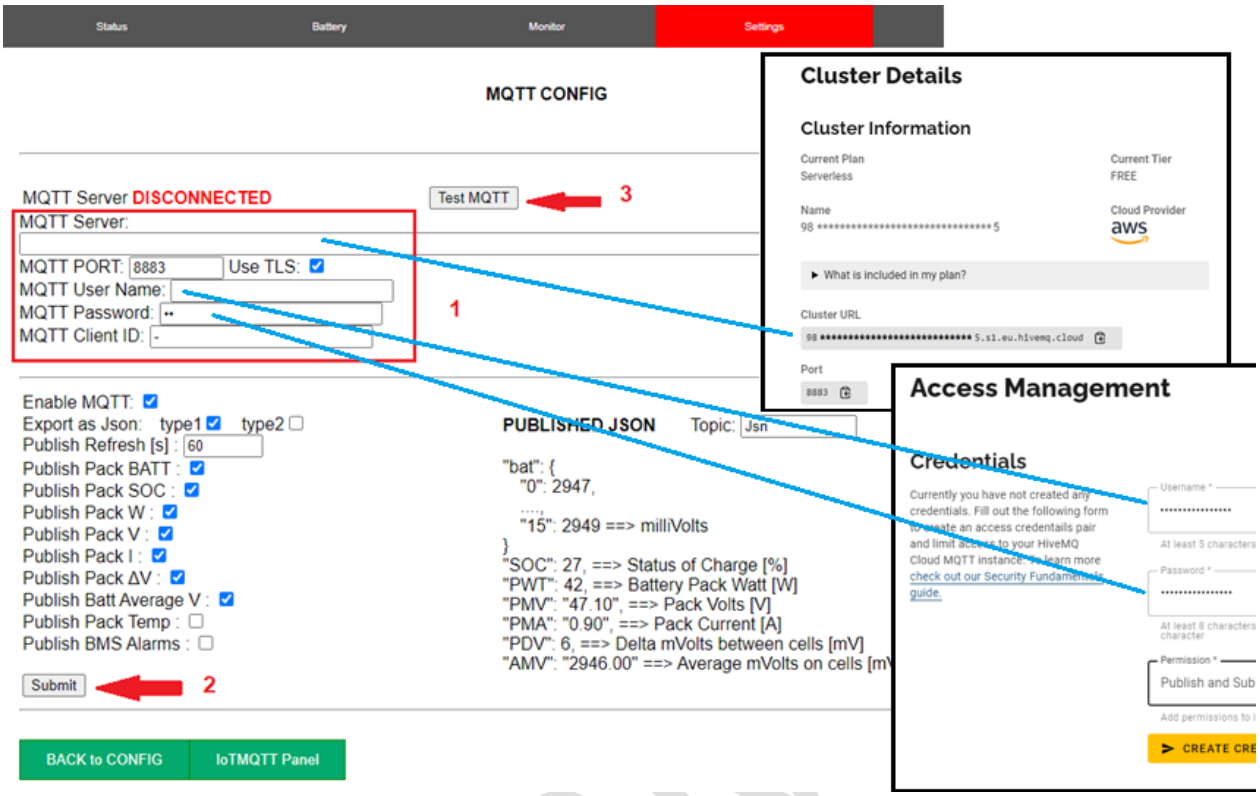


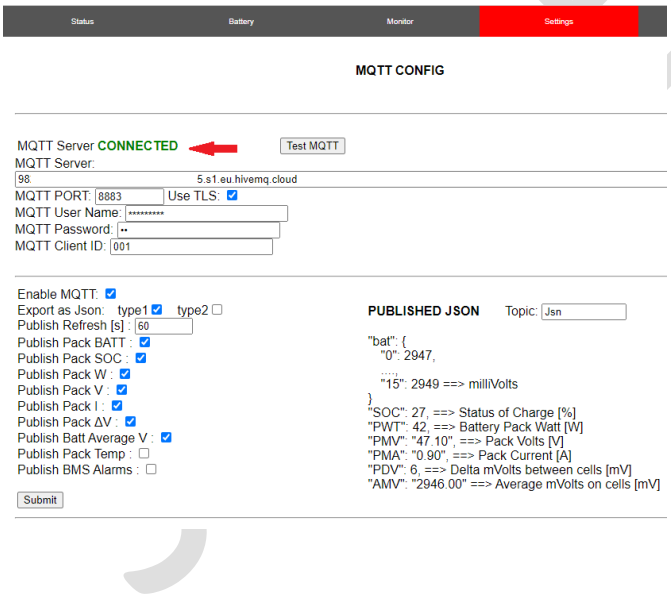
19- SETUP the dongle MQTT client web page with the data setuo get during the HIVEMQ setup (Steps 1-3 on this chapter)

NOTA: MQTT Client ID is the UNIQUE ID of this dongle – can be any numeric or alphanumeric ID – BUT --- must to be unique !

Having more than one dongle publishing on the same MQTT broker, each of them MUST have it's own unique ID.

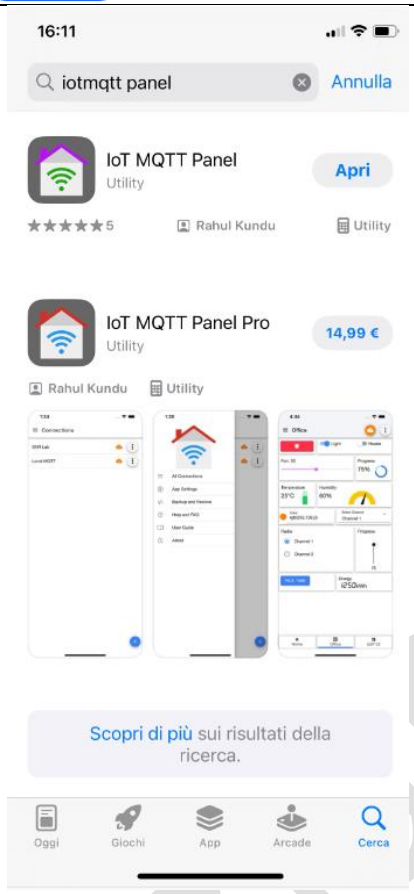
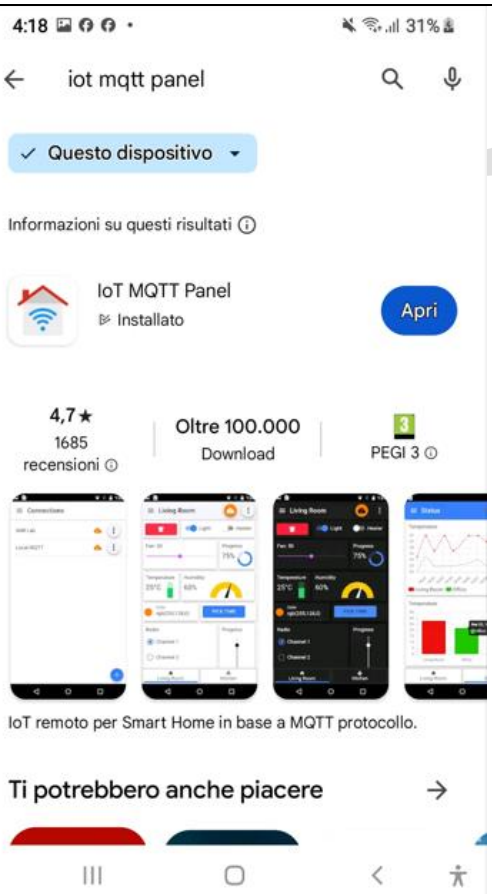
1- Configure the dongle CSubscriber MQTT with the HIVEMQ credentials as shown on the figure
2- CLONE the settings of the "checkmarks" in the figure
3- "SUBMIT"
4- When the page reload, press on "TEST MQTT"
   If all went fine you will read "MQTT Server: **CONNECTED**"


Status
Battery
Monitor
Settings
MQTT CONFIG
MQTT Server DISCONNECTED
Test MQTT
3
MQTT Server:
MQTT PORT: 8883
Use TLS:
MQTT User Name:
MQTT Password:
MQTT Client ID:
1
Enable MQTT:
Export as Json: type1 type2
Publish Refresh [s]: 60
Publish Pack BATT :
Publish Pack SOC :
Publish Pack W :
Publish Pack V :
Publish Pack I :
Publish Pack ΔV :
Publish Batt Average V :
Publish Pack Temp :
Publish BMS Alarms :
Submit
2
PUBLISHED JSON
Topic: Jsn
"bat": {
"0": 2947,
"15": 2949 ==> milliVolts
}
"SOC": 27, ==> Status of Charge [%]
"PWT": 42, ==> Battery Pack Watt [W]
"PMV": "47.10", ==> Pack Volts [V]
"PMA": "0.90", ==> Pack Current [A]
"PDV": 6, ==> Delta mVolts between cells [mV]
"AMV": "2946.00" ==> Average mVolts on cells [mV]
BACK to CONFIG
IoTMQTT Panel
Cluster Details
Cluster Information
Current Plan
Serverless
Current Tier
FREE
Name
Cloud Provider
aws
What is included in my plan?
Cluster URL
5.s1.eu.hivemq.cloud
Port
8883
Access Management
Credentials
Currently you have not created any credentials. Fill out the following form to create an access credentails pair and limit access to your HiveMQ Cloud MQTT instance. To learn more check out our Security Fundamentals guide.
Username *
At least 5 characters
Password *
At least 8 characters
Permission *
Publish and Sub
Add permissions to
CREATE CRE


Status
Battery
Monitor
Settings
MQTT CONFIG
MQTT Server CONNECTED
Test MQTT
MQTT Server:
98. 5.s1.eu.hivemq.cloud
MQTT PORT: 8883
Use TLS:
MQTT User Name:
MQTT Password:
MQTT Client ID: 001
Enable MQTT:
Export as Json: type1 type2
Publish Refresh [s]: 60
Publish Pack BATT :
Publish Pack SOC :
Publish Pack W :
Publish Pack V :
Publish Pack I :
Publish Pack ΔV :
Publish Batt Average V :
Publish Pack Temp :
Publish BMS Alarms :
Submit
PUBLISHED JSON
Topic: Jsn
"bat": {
"0": 2947,
"15": 2949 ==> milliVolts
}
"SOC": 27, ==> Status of Charge [%]
"PWT": 42, ==> Battery Pack Watt [W]
"PMV": "47.10", ==> Pack Volts [V]
"PMA": "0.90", ==> Pack Current [A]
"PDV": 6, ==> Delta mVolts between cells [mV]
"AMV": "2946.00" ==> Average mVolts on cells [mV]

CONFIGURE SmartPhone App via " IoTMQTT Panel "

1- Install "IoTMQTT Panel" on your smartphone – chose the free version

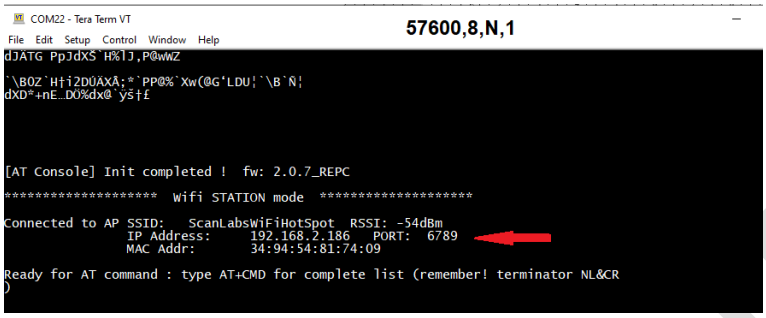
iOS APP Store	Android PlayStore
	

2- Go to the SSBdE dongle Webpage with your smartphone
With iOS and on the latest Android the dongle url is : http://smartbmsXY.local
Were XY depends on your setup – of course you can use the SSBdE dongle IP

NOTE: if you have changed the MDSN "smartbmsXY" name and the default PORT "80", you have to type yours.
On former Android version, you need to use the dongle IP rather than the MDSN name.
To get your dongle IP, either you use the USB console or you try to discover via your Router
See the section about how to Configure the dongle.

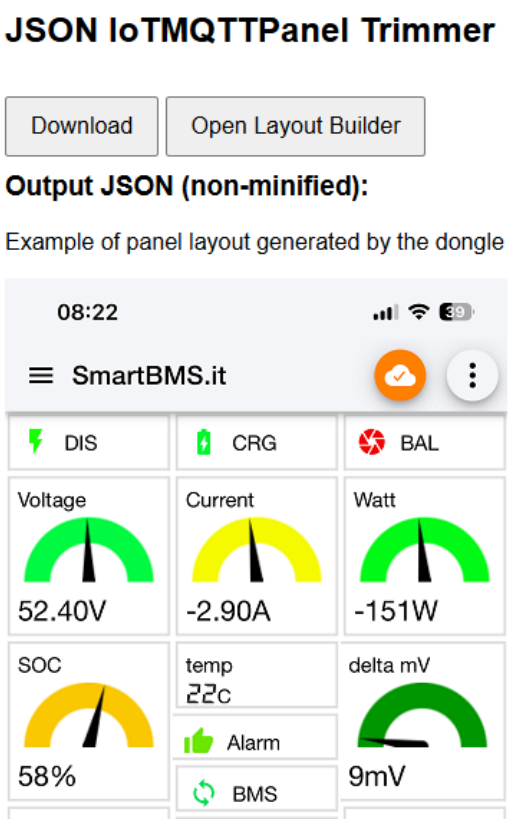
SSBdE dongle IP can be retrieved from the USB console too.
At boot time , many messages are shown , including the SSBdE dongle IP and port.

NOTE: if port is reported to be 80, you don't have to add it after the IP

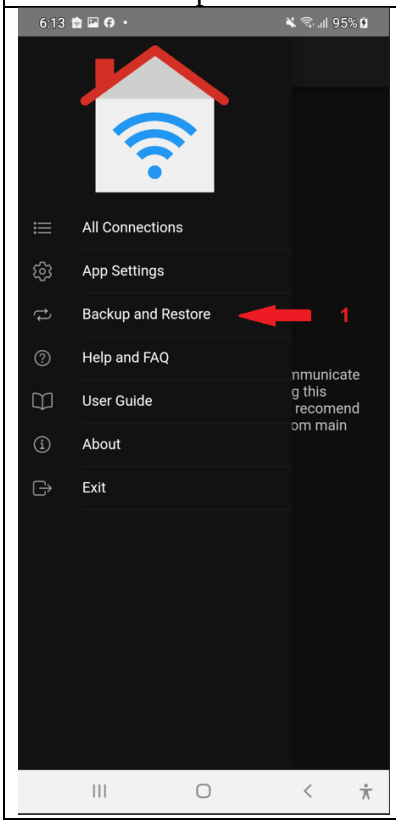
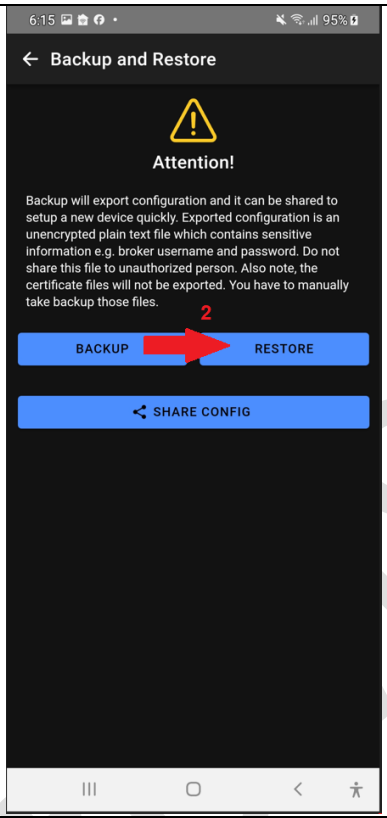
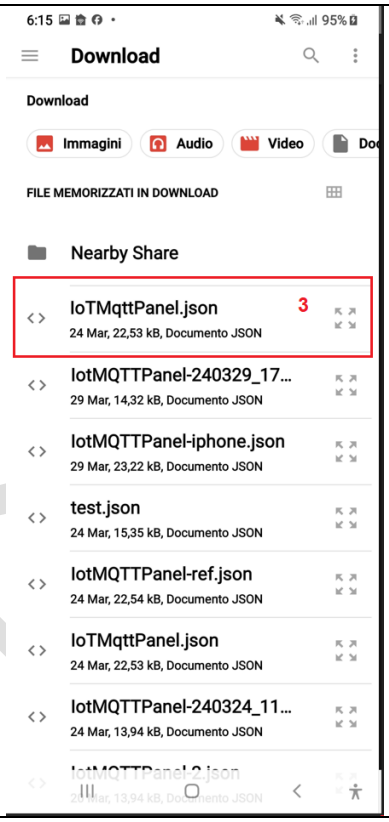


3- GO to "**Settings**" -> "**MQTT**" -> "**IoTMQTT Panel**" -> "Download"
An "***IoTMqttPanel.json***" file with all the needed onfig is generated by the dongle
Download the generated file "***IoTMqttPanel.json***"

Alternatevely you want to open the "***Layout Builder***" which will be populated with the full widget layout.
At this time you can customize the dashboard as you whish.
Follow the Youtube Video: https://www.youtube.com/watch?v=l8NB_Wk8uVw&t=24s



4- Open the app “IoTMQTT Panel”, click on the 3 lines on TOP-SX , follow steps 1-2-3

1- Backup and restore	2- RESTORE	3- Seleziona il file
		

5- YOU ARE DONE !

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LIST OF BMS PARAMETERS AVAILABLE VIA MQTT

When MQTT is configured and enabled the following packet is published independently from the BMS activities.

{"Status":1,"ts":"12/22/25 13:12:47","cnt":2535,"mem":11696}

JSON Name	Possible Values	Comments
Status	0,1	0: BMS unreachable 1: BMS active
ts	12/22/25 13:12:47	Time Stamp of the last MQTT frame sent
Cnt	0-65535	Seconds till boot
mem	0-20000	Free Platform Memory [Bytes]

The following MQTT frames are published ONLY if there's a communication with BMS

{"SCM":57,"MIC":3318,"MAC":3313,"CAP":310.0,"RCP":178.8,"CYC":137,"temp":{"tm":0,"t1":350,"t2":0,"t4":0,"t5":0},"mos":{"Ch":1,"Di":1,"Ba":0}}

JSON Name	Possible Values	Comments
SCM	0-100	MAX SOC reached today
MIC	0- Max Cell Voltage	Minimum Cell Voltage
MAC	0- Max Cell Voltage	Maximum Cell Voltage [mV]
CAP	0- Max Battery Capacity	Max Capacity [Ah]
RCP	0- Residual Capacity	Residual Capacity [Ah]
CYC	0-	Cycle Capacity
temp		
mos	1= Enabled 0= Disabled	MOS STATUS Ch = Charge Di = Discharge Ba = Balance

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{"bat":{"0":3313,"1":3318,"2":3320,"3":3319,"4":3319,"5":3319,"6":3319,"7":3318,"8":3319,"9":3319,"10":3320,"11":3319,"12":3318,"13":3319,"14":3320,"15":3313},"SOC":57,"PWT":355,"PMV":"53.00","PMA":"6.70","BAC":"0.0","PDV":7,"AMV":3318,"TMP":35.0,"ALM":"0,1,0,0,0,0,0","ALMF":1,"DMS":1,"CMS":1,"BMS":0,"VCM":0,"VMD":1,"SIP":"192.168.2.254:6790"}

JSON Name	Possible Values	Comments
{"bat":{"0":2927,…"15":2945}	0- Max Cell Voltage	Json2 format [mV]
{"b0":2936,...,"b15":2953,	0- Max Cell Voltage	Json1 format [mV]
{"res":{"0":2927,…"15":2945}	0- Max Cell Res.	Json2 format [moHm]
{"r0":2936,...,"r15":2953,	0- Max Cell Res.	Json1 format [moHm]
SOC	0- Max Cell Voltage	Status of Charge [%]
PWT	0- Max Battery Pack Watt	Battery Pack Watt [W]
PMV		Pack Volts [V]
PMA		Pack Current [A]
BAC		
PDV	0- current delta	Delta between cells [mV]
AMV	For LifePo4 around 3200	Average mVolts on cells [mV]
TMP		Pack temperature in [C]
ALM	0,4,0,0,0,0,0	Alarms byte stream
ALMF	1= Alarms 0= No Alarms	Alarms Flag 1=ALARMs 0=NO ALARMS
DMS	1= Enabled 0= Disabled	Discharge MOS status
CMS	1= Enabled 0= Disabled	Charge MOS status
BMS	1= Enabled 0= Disabled	Discharge MOS status
VCM	1= Enabled 0= Disabled	Virtual COM enabled
VMD	1= Server 0= Client	Setup Virtual Uart to be a Server or a Client
SIP	String IP:PORT	Virtual COM Server IP:PORT

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BMS PASS-THROUGH



PASSTHROUGH feature, allows the ScanLabs Smart BMS data Extractor (SSBdE) to let original BMS gadget to work in Series with the dongle sharing the same BMS physical port.
Tipically used for DALY WiFi, Bluetooth Dongle , for JK / DALY display.
NOTE – this feature is not suitable for JK-PBx

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VIRTUAL UART TUNNEL

UART Tunnel feature allows to use PC Software for BMS over Internet . Yes you can connect to the JK or DALY BMS using their standard software from any corner of the connected world.

Feature tested with:

- DALY BmsMonitor -> ***PCMaster*** // BMSMonitoV2.1.5
- JK ***JK-BMS-MONITOR*** 2.5.0 / 2.8.0

NOTE: While Virtual UART TUNNEL is Active, all the other dongle features are disabled.

Virtual UART Tunnel is enstablished via **Internet** or via local **LAN** - from any remote sites and until you have an internet connection and a *ScanLabs Smart BMS Data Extractor* connected to your BMS – you can Virtualize a Direct UART connection with the BMS

How it works ? Basically thanks to a mix of tools and features exposed by the SSBdE you can 'Simulate" having a local USB CABLE connected to the BMS and the PC.
This "Virtual UART" is tunnelled via internet/Local LAN till your BMS

Since rel 3.5.2 virtual Uart support **SERVER** and **CLIENT** mode.

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Virtual UART SERVER

vUART SERVER : the dongle SSBdE expose a Server, a client connect to the IP of the server to create a virtual UART.
What you need to use it from local LAN ? no special configuration is needed on your router
What you need to use it from INTERNET ? there's a main constrain … SSBdE must be exposed to internet, meaning your router has a public IP and you created a PORT FORWARD to local SSBdE port and deafult Virtual Uart Tunnel 6790 (or the one you selected on the main mage)
The Virtual Host/IP forwarding rule on your router looks like the following

External IP	External Port	Internal IP	Internal Port
ANY	6790 (or any other free port > 1024)	YOUR dongle Internal IP	**6790 (or any port you have selected on the virtual UART conf page)**

This Port Forwarding rule simply says that all the traffic from internet coming on External port 6790 is routed to dongle IP port 6790 where the VIRTUAL UART TUNNEL Server is binded.

Don't warry about hacking attack, VIRTUAL UART TUNNEL is a feature that must be intentionally enabled from **Settings->UART TUNNEL** page and auto-expires after 120s for inactivity

What you need to install on your PC ?
To Virtualize an UART over Internet , you need a program that create a TCP-UART.
Multiple options are available:

- "**HW Virtual Serial Port**" from https://www.hw-group.com/
  - This SW works fine for DALY but it does NOT work for JK due to a bug I discovered on long packets like JK has & needs

- "**HHD Virtual Serial Port**" from https://hhdsoftware.com
  - This SW works with both JK-PBx and DALY

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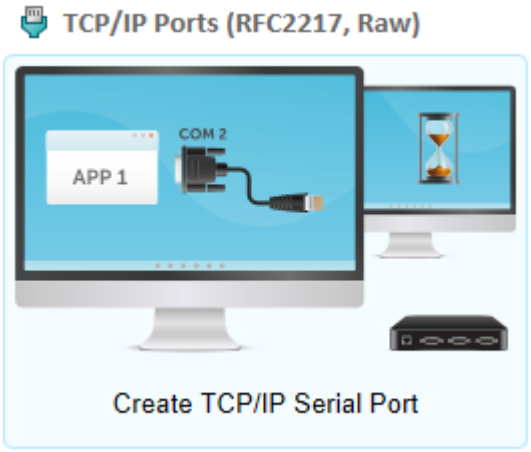
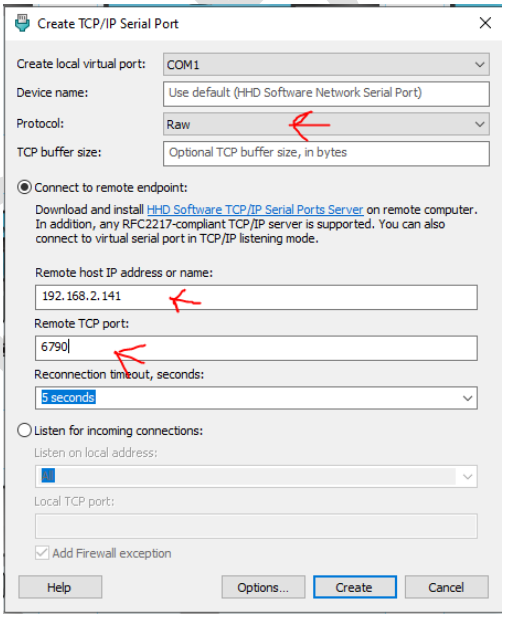
Configuring "HHD Virtual Serial port Tools" (work with JK & DALY - Recommended)

1- Install on Windows PC the software "**HHD Virtual Serial Port Tools**"
   a. You can use the provided : free-virtual-serial-port-tools.exe
   b. You can download from HDD web site https://hhdsoftware.com

2- Open the SW - Select **TCP/IP Ports (RFC2217, Raw)**



3- Customize like in the image, Remote host IP can be LOCAL or Internet **SSBdE IP address**

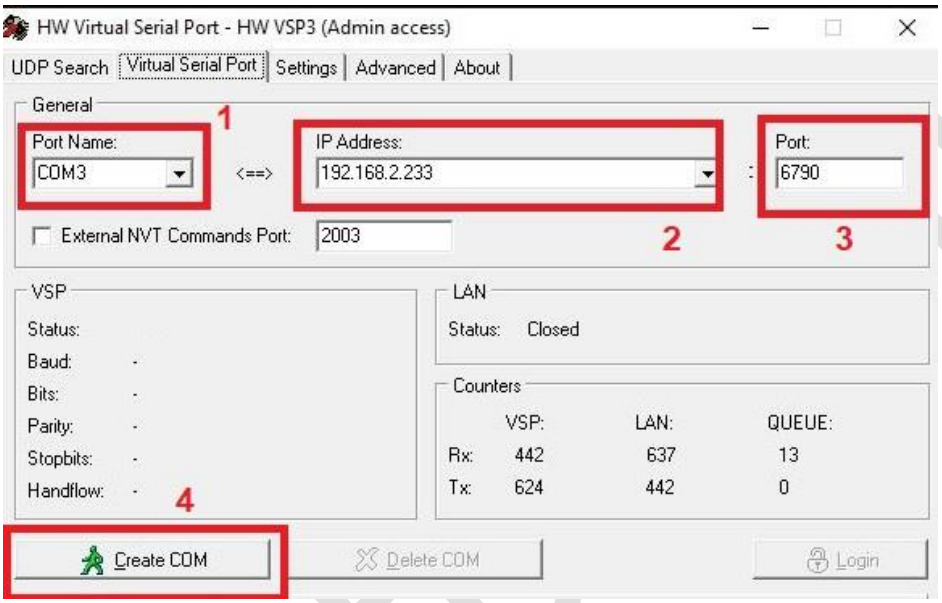


4- "HHD Virtual Serial Port Tools" will create a Virtual tunnel to the IP of the dongle (local or via Internet) on COM1 (In my case, check on your system which COM port is enabled, you find the port on the top of the screenshot before)

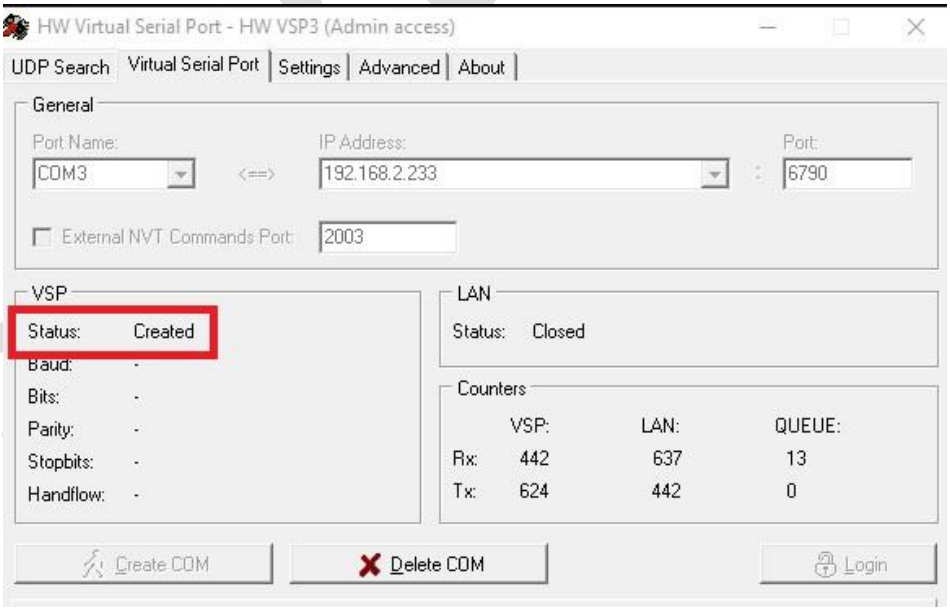
Configuring "HW Virtual Serial port" (not for JK)

Download and install the software – open it : from https://www.hw-group.com/ or HERE

- 1- Select the COM port Number to be created
- 2- Local or Public IP of the ScanLabs Smart BMS data Extractor
- 3- Local or Public PORT of the SSBdE (6790 is de default)
- 4- Create the COM

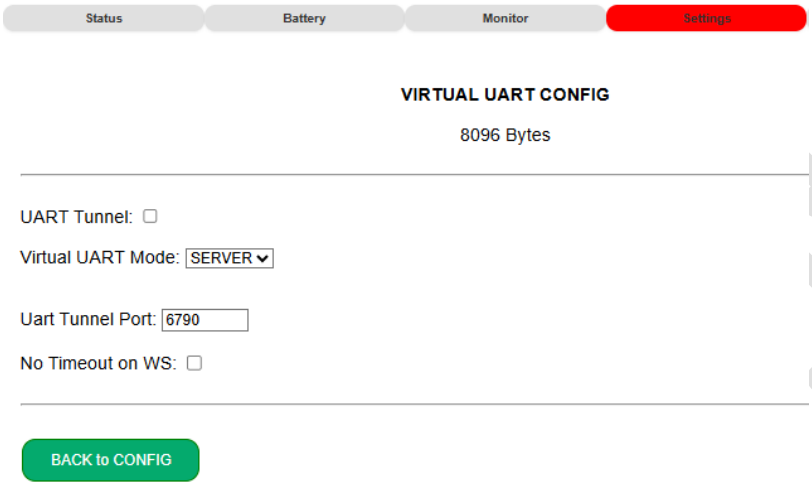


2- If all good you will read – Status Created



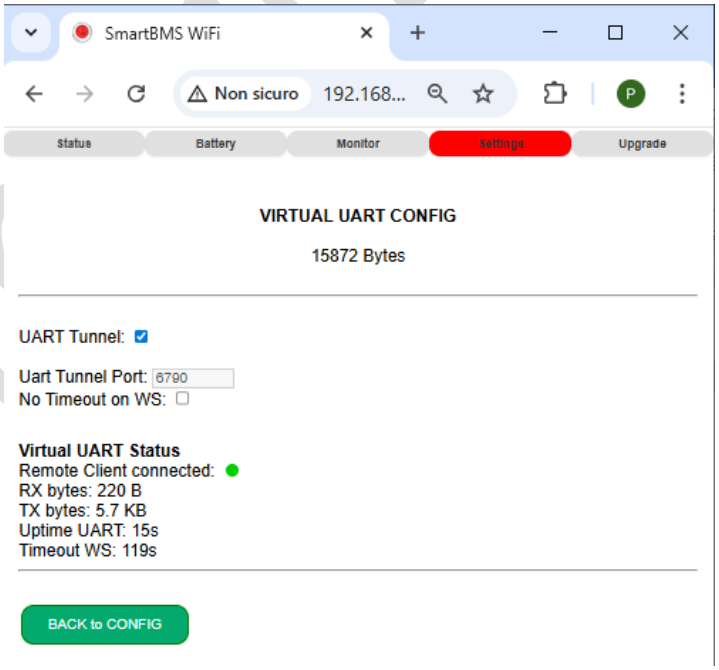
Configuring "Virtual UART Service" on the SSBdE

1- Go to SSBdE web pages: Settings -> "UART TUNNEL"
-> Select Virtual UART Mode: SERVER
-> Enable "UART TUNNEL"



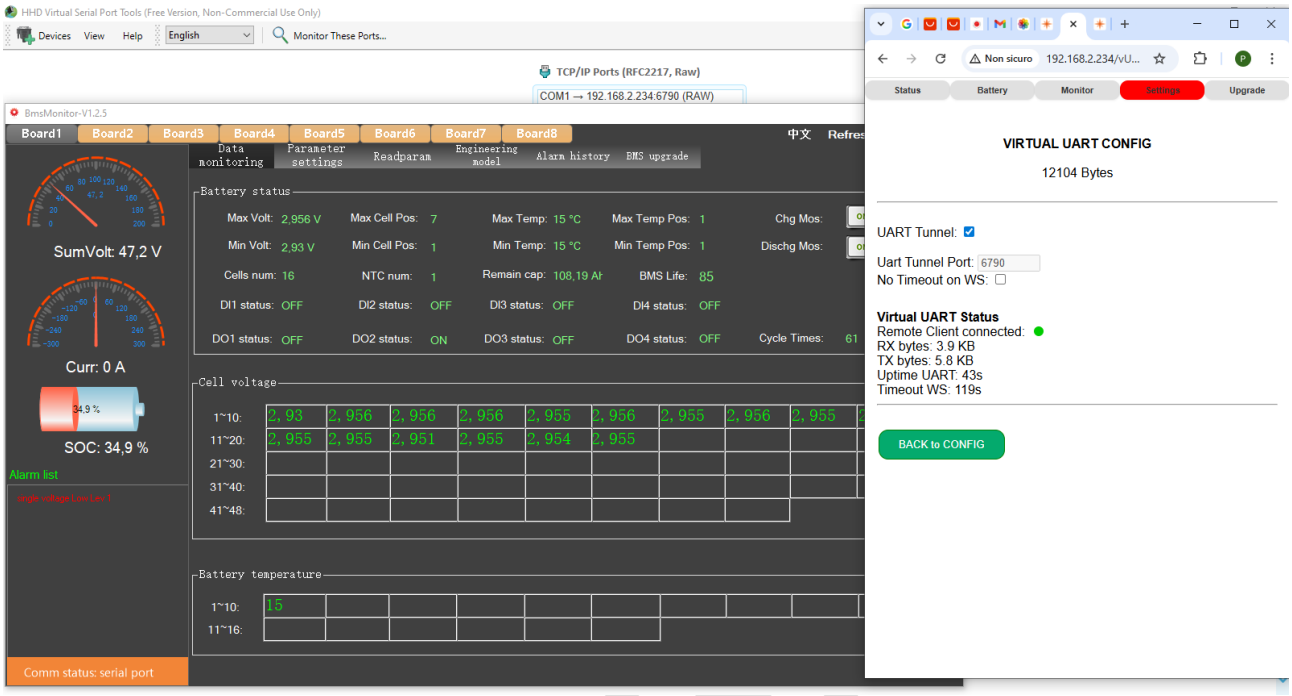
2- For security reasons the UART Tunnel will expire within 120s if NO activity is detected.
3- You can set NO expiring time clicking on "**No Timeout on WS**"
4- Open JK-BMS-MONITOR or PCMaster
5- Select the same COM just created by HW or HDD software … and Voila !

Connection info will appear when the client is connected alongside with some TX/RX bytes counters



PC Based BMS Software Managers for DALY and JK -BMS

DALY BMSMonitor-v1.2.5 aka PCMaster.exe



JK-BMS-MONITOR 2.7.0 / 2.8.0

TBD

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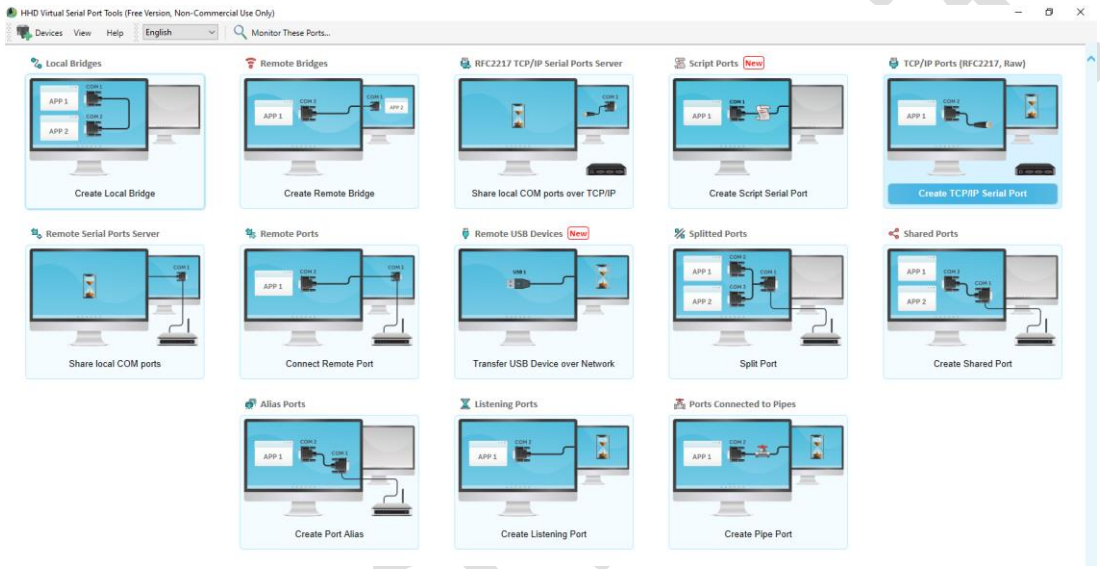
Virtual UART CLIENT

HOW TO TEST VIRTUAL UART IN CLIENT MODE

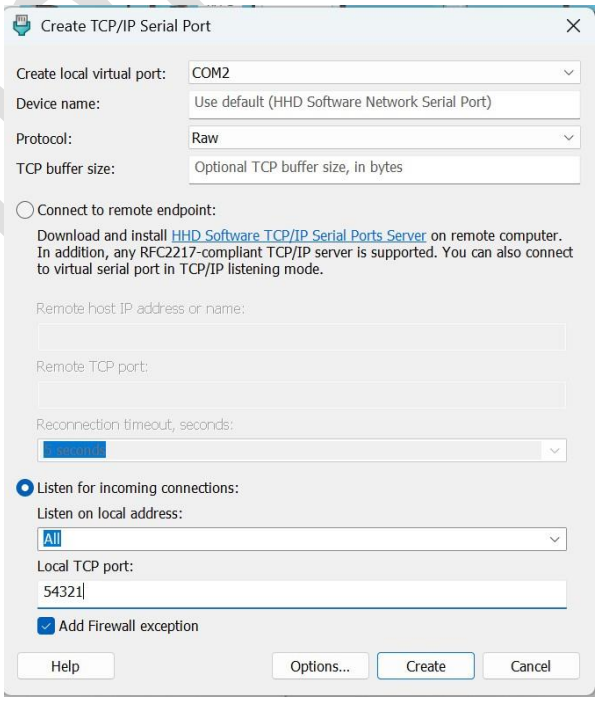
SETUP THE PC AS UART SERVER

1- Install on Windows PC the software "HHD Virtual Serial Port"
   a. You can use the provided : free-virtual-serial-port-tools.exe
   b. You can download from HDD web site https://hhdsoftware.com

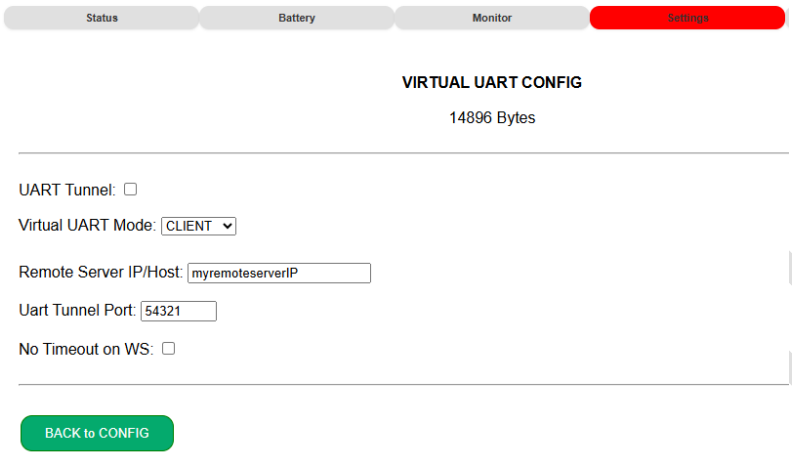
2- Select **TCP/IP Ports (RFC2217, Raw)**



Customize like shown in the image, local port can be any number between 1025 to 65535



3- “HHD Virtual Serial Port” will create a Virtual tunnel Server waiting for the dongle to initiate the coonection (local or via Internet) on COM2 (check on your system which COM port is enabled)
4- Go to the ScanLabs Smart BMS Data Extractor dongle,
go to Settings -> UART Tunnel.



5- For security reasons the UART Tunnel will expire with 120s if NO activity is detected.
6- Clicking on “No Timeout on WS” the session will not auto-expire
You can remove this expiring time clicking on “No Timeout on WS”
7- Select Virtual UART Mode as CLIENT
8- Add the “Remote Server IP/HOST” can be the Server IP or hostname
9- Select the Uart Tunnel Server PORT: 54321 in this case
10- Enable “UART Tunnel”

NOTE: when you click on “UART Tunnel” to start it, the HHD SERVER on the PC must be already configured, otherwise the connection fails

11- Open JK-BMS-MONITOR pr PC-MONITOR, select the COM created by the HDD software (COM2 in this example) … and Voila !

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HOW TO ENABLE VIRTUAL UART CLIENT VIA MQTT (IotMQTTPanel)

1- Download the latest IoTMQTTPanel.json config file from MQTT Page and import it on IoTMQTTPanel app.

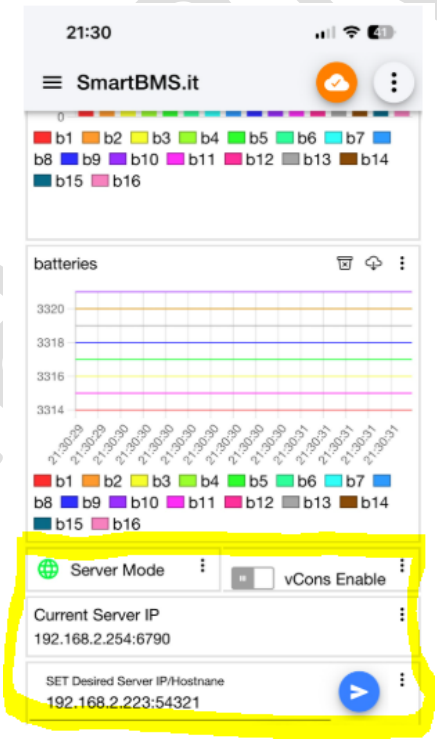
The new IoTMQTTPanel.json define a new Virtual UART configuration panel like in the image below.
Via this panel you can configure the dongle to:

1- Enable SERVER Or CLIENT Virtual Uart Mode pushing on “Server Mode”.

Server Mode = green ➔ SERVER MODE enabled = the dongle wait for a remote connection
Server Mode = red ➔ CLIENT Mode enabled = the dongle connects to a server:port

2- For Client MODE, you MUST specify the remote Server IP/Hostname:Port.
In “Current Server IP” the actual settings the dongle have.
In “Set Desired Server IP/Host” the target Host/IP:PORT you want to push

NOTE: The dongle send these parameters every 30s.
After you set the Host/IP:PORT wait till the Current Server IP is the same as the desired one.
When ready switch the “VCons Enable” switch.
Within 30s , the dongle will connect to the Server and the data will appear on the JK-MONITOR or PC-MASTER software
Switch “VCons Enable” back to off to close the connection



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MODBUS TCP SERVER

Hardware REG (Function **03**)
BASE address **100 -** Server PORT **502**
Float Little Endian

Function	Unit	Offset	Type	Description
SOC	%	0	U16	Status of Charge
Pack Volts	V	1	U16	Battery Pack Volts
Pack Amps	A	2	S16	Battery Pack Amps
Pack Power	W	3	S16	Battery Pack Power
Batts mv-Delta	mV	4	U16	Batteries max delta
Batts mv-Average	mV	5	U16	Batteries Average
Max Batt	mV	6	U16	NEW Max mV on batteries
Min Batt	mV	7	U16	NEW Min mV on batteries
Temp	C/F	8	Float	Temperature Avg
Pack Volts	V	10	Float	Battery Pack Volts
Pack Amps	A	12	Float	Battery Pack Amps
Pack Power	W	14	Float	Battery Pack Power
DISCHARGE MOS	Status	17	U16	0-OFF 1-ON
CHARGE MOS	Status	18	U16	0-OFF 1-ON
BALANCE MOS	Status	19	U16	NEW 0-OFF 1-ON
Battery 1	mV	20	U16	Battery 1 mV
Battery 2	mV	21	U16	Battery 2 mV
Battery 3-15	mV	22..34	U16	Battery 3..15 mV
Battery 16	mV	35	U16	Battery 16 mV

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Num of Batts		40	U16	Number of Batteries
Max SOC	%	41	U16	daily MAX SOC
Max SOC	hours	42	U16	daily MAX SOC @ hour
Max SOC	minutes	43	U16	daily MAX SOC @ minutes
Capacity	mAh	44	U16	Current Capacity
Failure Flag	Status	45	U16	0-No Failure 1-Failures
Sys Heap	bytes	50	U16	Free Heap Memory
Sys Counter	#	51	U16	Monotonic 1s Counter
TZ	#	52	S16	Time Zone
DID	#	53	U16	Color Display this Dashboard ID
DISPLAY1	reg	54	U32	byteWise 0x A'A BB CC DD: A'=Number of Dashboards A&0x2=auto Rolling A&0x1=auto Brightness ON/OFF BB=level_Max CC=level_Avg DD=level_Min
DISPLAY2	reg	56	U32	byteWise 0x AA BB BC CC: AA=AutoScreen Rolling_Sec BBB=Seconds_at_level_Max CCC=Seconds_at_level_Avg
TEMP. SENS 1	0.1 °C	70	U16	NEW Temperature of Sensor 1 in 0.1 °C
TEMP. SENS 2	0.1 °C	71	U16	NEW Temperature of Sensor 2 in 0.1 °C (read 0 if NA)
TEMP. SENS 4	0.1 °C	72	U16	NEW Temperature of Sensor 4 in 0.1 °C (read 0 if NA)
TEMP. SENS 5	0.1 °C	73	U16	NEW Temperature of Sensor 5 in 0.1 °C (read 0 if NA)
TEMP. MOS	0.1 °C	74	U16	NEW Temperature of MOS in 0.1 °C (read 0 if NA)
BALANCE CURRENT	mA	80	U16	NEW Balance Current in mA (read 0 if NA)

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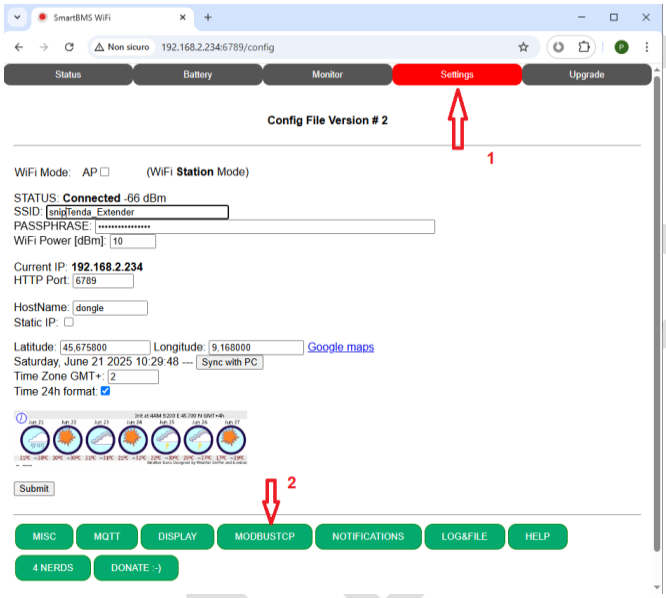
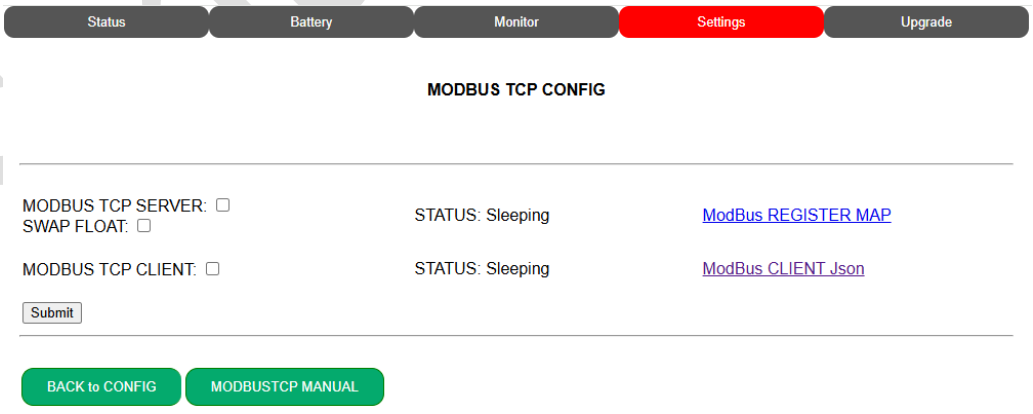
MAX CELL ID	#	90	U16	NEW ID of the Cell at MAX V
MIN CELL ID	#	91	U16	NEW ID of the Cell at MINV

MODBUS TCP Server is not active by default - enable it
GO to "***Settings***" -> "***MODBUS CONFIG***"



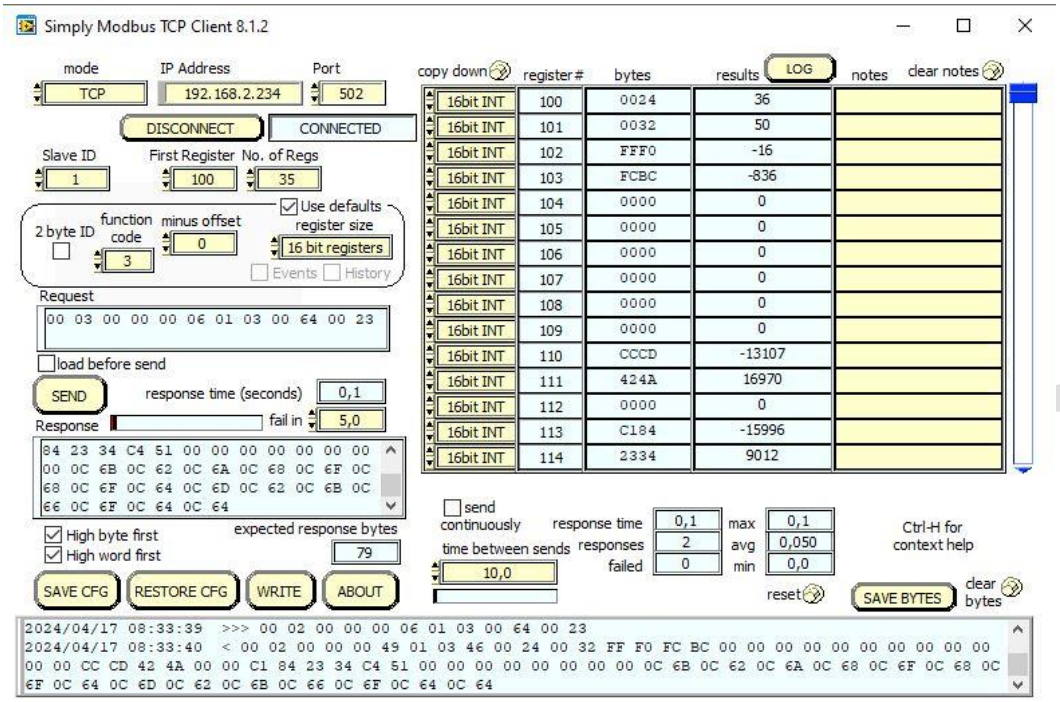
Enable MODBUS TCP Server
Click on the check button and "***Submit***" (no reboot needed)

NOTE : *due to limited resources it is NOT suggested to have MODBUS TCP and MQTT working in Parallel*

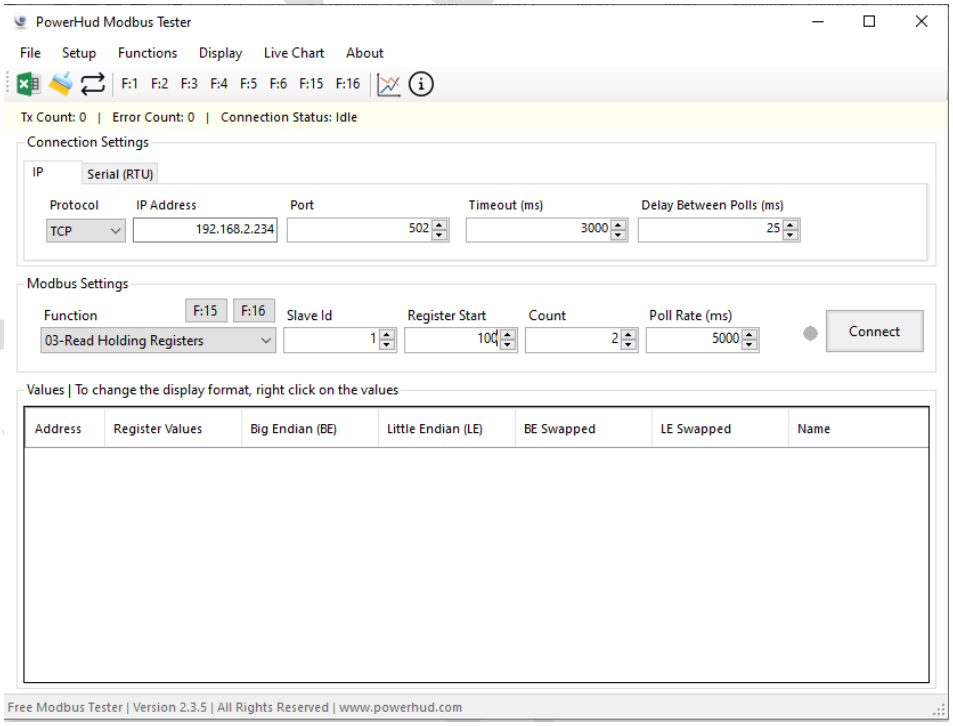


STATUS flag will show the current Server or Client statuses

How to TEST the dongle MODBUS TCP Server with ***PC***?
Any Standard MODBUS TCP Client is fine - for quick test you can use "*Simply MODBUS TCP Client*"



PowerHUD ModBus tester is good and fully free (https://www.powerhud.com/en/)



How to TEST MODBUS TCP Server with ***SmartPhone*** ?

There are multiple ways , one project I like and I would like to see it increasing the number of users is **Virtuino**

- 1- Install "**Virtuino**" APP on your mobile
- 2- download ***THIS*** configuration file
- 3- Open the Virtuino App -> "My projects" -> "Import project" -> select the ".vrt7" configuration file provided
- 4- from the three dots -> "My Connection or Devices" -> "Modbus TCP/IP" -> URL -> customize with your LAN or WAN IP address.

What you need to use MODBUS Server from INTERNET ? there's a main constrain … SSBdE must be exposed to internet, meaning your router has a public IP and you created a PORT FORWARD to local SSBdE port 502
The rule looks like the following

External IP	External Port	Internal IP	Protocol type	Internal Port
ANY	502 (or any other free port > 1024)	YOUR dongle Internal IP	**ANY**	**502**

This Port Forwarding rule simply says that all the traffic from internet coming on External port 502 is routed to dongle IP port 502 where the MODBUS Server is.

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MODBUS TCP CLIENT

From SSBdE software version 3.3.0, a MODBUS Client feature is available.

You can push data from the dongle to your local/remote Modbus Server.

STEPS to setup MODBUS client :

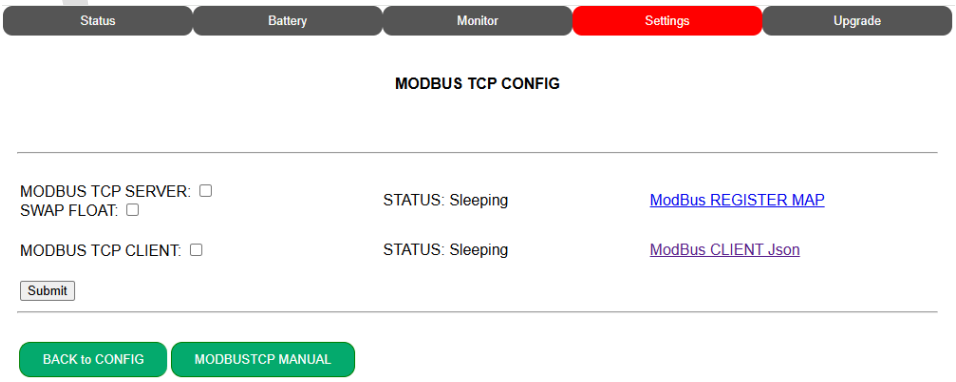
3- Build a file named "**ModBusClient.json"** on your PC via notepad or similar – you can download a template from here

JSON FORMAT	DESCRIPTION	NOTES
{ "IP":"XXX.XXX.XXX.XXX", "PORT":8101, "sID":1, "Tm":10, "BASE":200, "MAP": { "Bat":0, "PV":32, "PI":34, "PW":38, "mVA":40, "mVD":36, "SOC":37, "Cap":39, "TC":41, "Heap":29, "MonC":30 } }	**IP**: MODBUS SERVER IP **PORT**: MODBUS SERVER PORT **sID**: THIS DONGLE SLAVE ID [typical 1] **Tm**: Time [sec] for pushing data to Server *NOTE*: if Tm < BMS Polling Time, the latter wins **BASE**: BASE offset registers address **MAP**: Contains Pairs DATA : OFFSET *NOTE*: each selected DATA is published at OFFSET+BASE **Bat**: ALL the batteries are published starting from this address [mV] *EG*: 16-Batteries are published till OFFSET+BASE+16-1 **PV**: Battery pack Voltage [mV] **PI**: Battery pack Ampere [10mA] **PW**: Battery pack Watts [W] **mVA**: Battery pack average [mV] **mVD**: Battery pack Delta [mV] **SOC**: Status of Charge [%] **Cap**: Residual Capacity [Ah] **TC**: Temperature [C] **Heap**: System Memory [Bytes] **MonC**: Monotonic 1s Counter	**NOTE 1:** each data uses **uint16** register **NOTE 2:** Current are in 10mA - must be used as int16 max +/- 327A **NOTE 3:** PARTIAL json are accepted (containing only the info you need) **NOTE 3:** json file must be named **ModBusClient.json** and loaded into file system from **LOG&FILE** session

4- Customize the **ModBusClient.json** file depending on the parameters you want to expose to the Server, the ModBus Server IP / PORT etc

5- UPLOAD the **ModBusClient.json** file on the SSBDE dongle via the "**LOG&FILE" tab -> Upload**

6- Check the Flag "MODBUS TCP CLIENT" -> Submit
The STATUS Flag will give info about the Client status



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VIRTUINO APP: HOW TO CONFIGURE for SmartPhone and PC



TARGET: Use Virtuino APP using MODBUS
Link with me directly if you are interested on this

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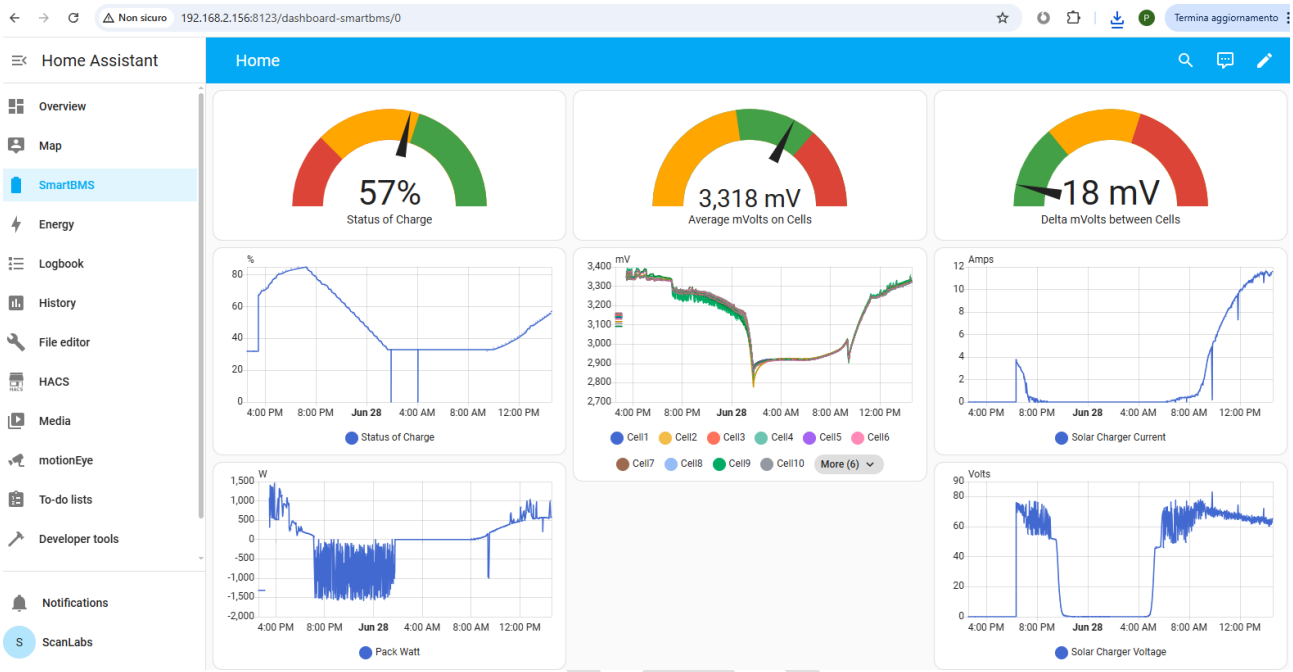
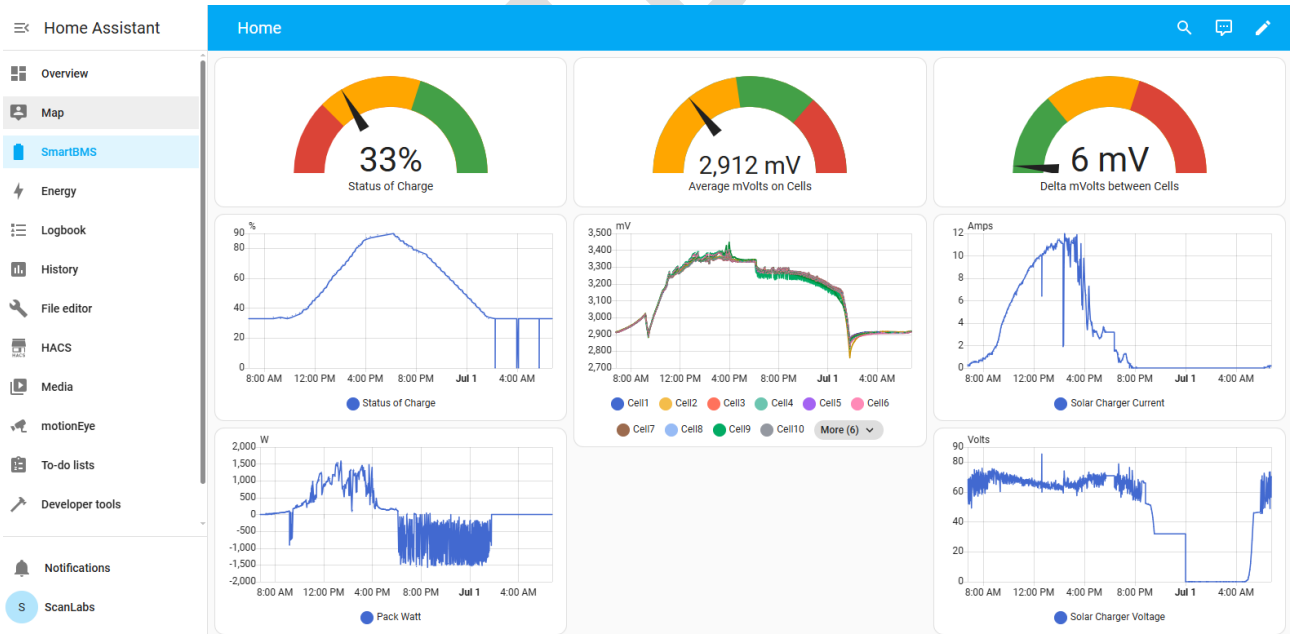
HOME ASSISTANT

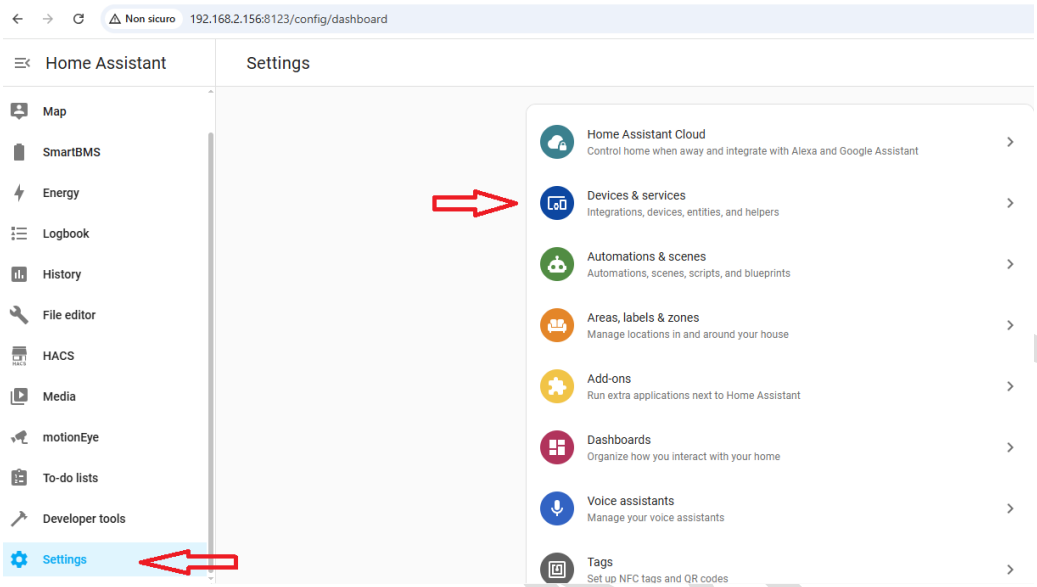
Home Assistant provides a professional way to monitor and perform actions based on events / scenarios. ScanLabs BMS data Extractor is fully compatible with HA, hereunder an example of a DashBoard you can build.



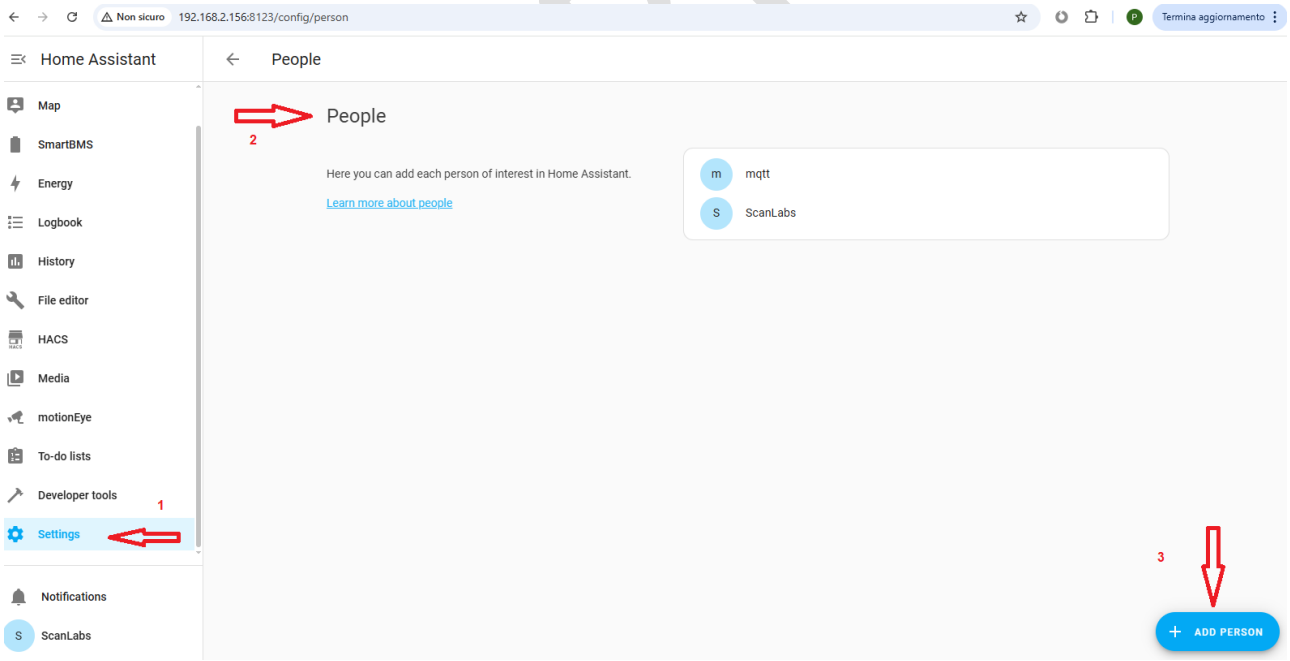


INSTALL MOSQUITTO MQTT BROKER

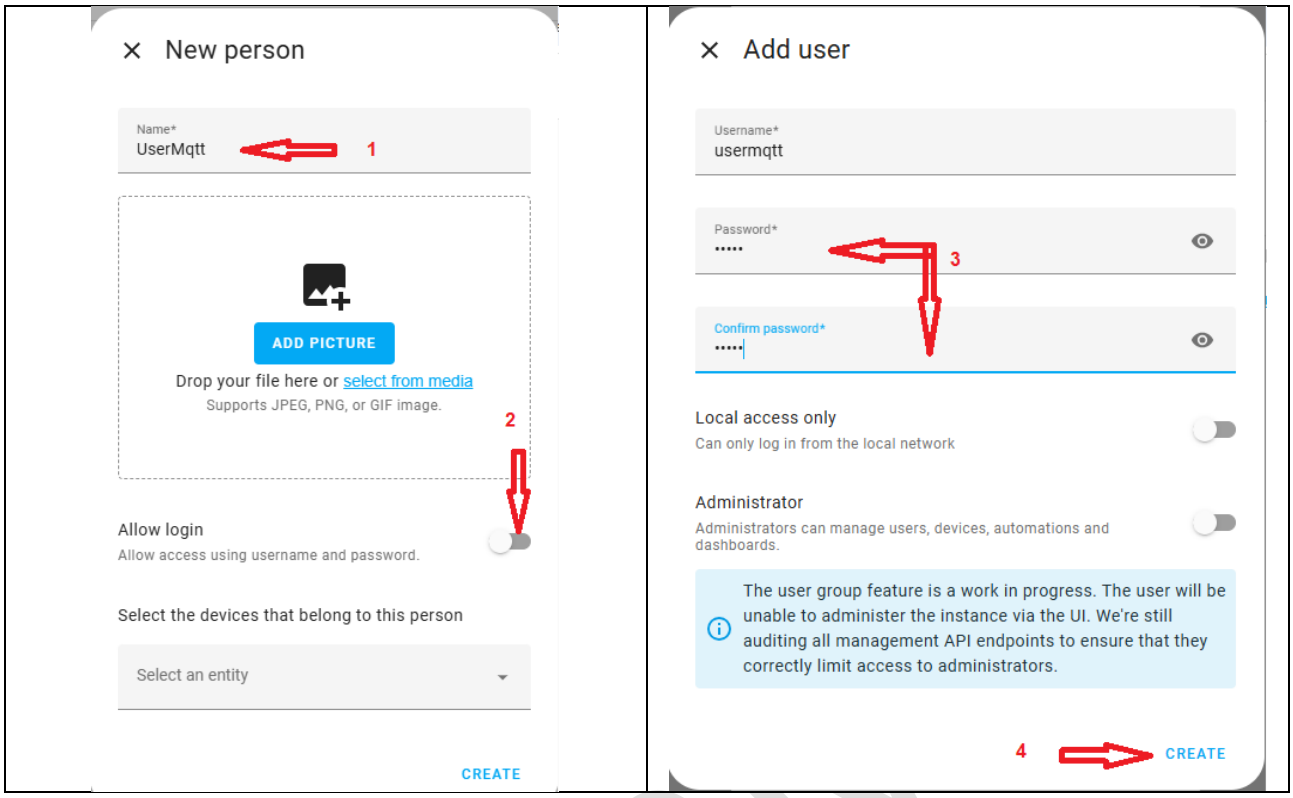
Go to “Settings”-> “Devices & Services” , search for Mosquitto, install it – run at the start-up



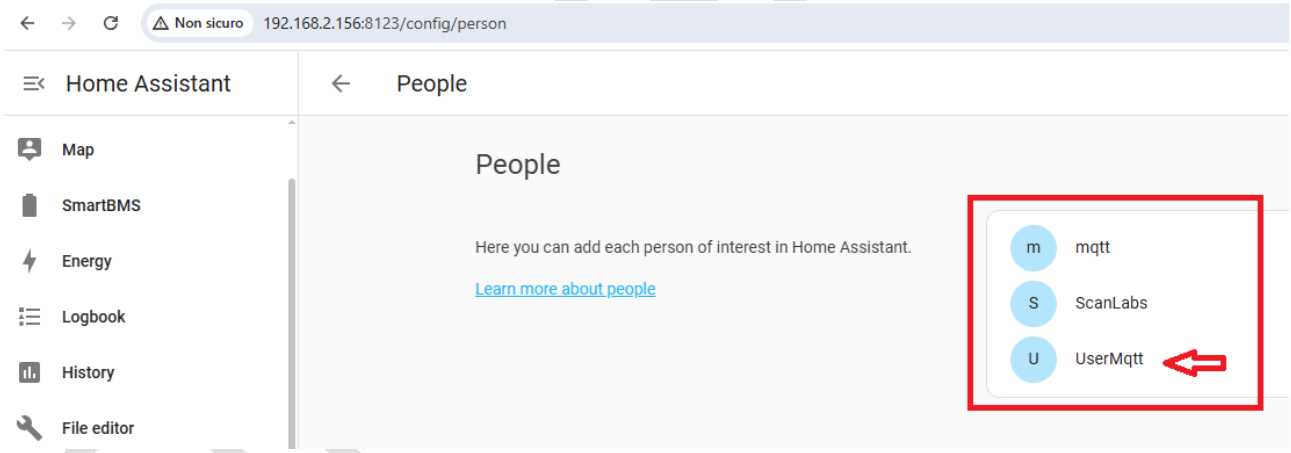
If still not available, create a new account to let the ScanLabs BMS Smart data Extractor to publish the BMS data.
Go to “Settings”-> “People” -> “+ ADD PERSON”



1- Define a “Name”
2- “Allow login”
3- Customize “username” & “password”
4- CREATE



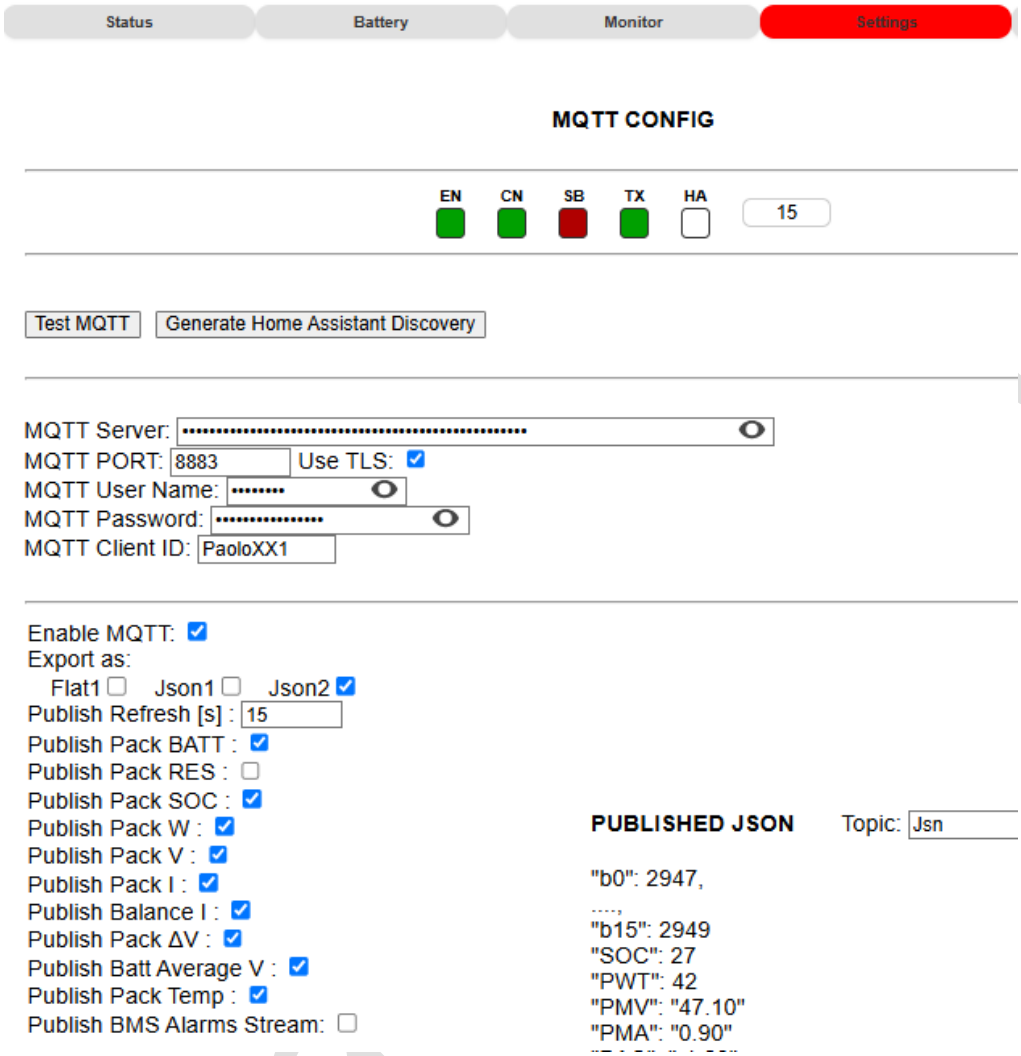
The new created credentials will be shown on the People panel



NOTE: YOU MUST configure the ScanLabs SmartBMS data Extractor MQTT client accordingly with the HA Mosquitto setup:

MQTT Server: IP or Name of your Home Assistant device
MQTT Port: either 1833 no TLS OR 8883 with TLS – depending on your mosquito configuration
NOTE: Ports could be different if you have customized them
MQTT User Name: Is the User -> username just added
MQTT Password : id the User -> password just added
MQTT Client ID is a RANDOM field that must be different for each client connecting to your MQTT Broker

NOTE: as MUST to use the configuration-addon.yalm template is to setup
Export as -> JSON2



Check MQTT conenction to Home Asisstant by pressing the “Test MQTT” button.
IF the check button “CN” becomes green – you well setup the MQTT Publisher.
NOW you can press on “Generate Home Assistant Discovery” to let HA to discover the dongle .

OR you can do it manually following the next session.

EDIT YOUR CONFIGURATION.YAML

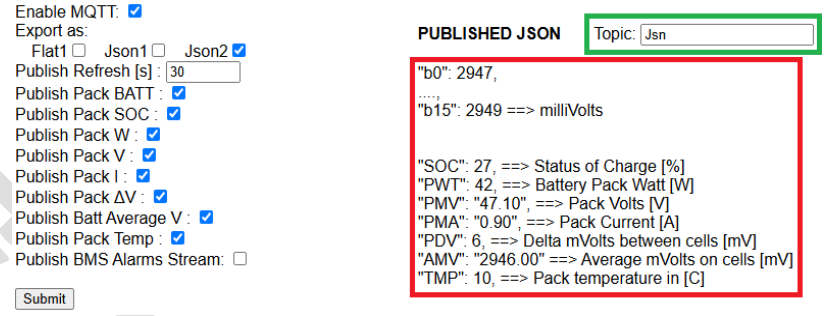
Get the file : "*configuration-addon.yaml*".
From ScanLabs BMS data Extractor version 3.2.5 is part of the SW release on the folder "HA",
or you can directly download from here: [configuration-addon.yaml]
Open the file, you will find a section "***mqtt***" where we define a new "sensor" type.
Each "***sensor***" is composed by multiple "***entities***" (-name: section on the yaml file)
Each "***entity***" has a "name" and a "***state_topic***" fied among the others
As MUST to do, configure each "***state_topic***" to match what you have set on the ScanLabs BMS data Extractor.
If you have multiple battery packs you MUST :

5- CLONE the "sensor:" for each Battery Pack you have
6- EDIT each "sensor"->"entity" ->"state_topic" to match the S.B.D.E "Published JSON Topic" available on the MQTT dongle's page .

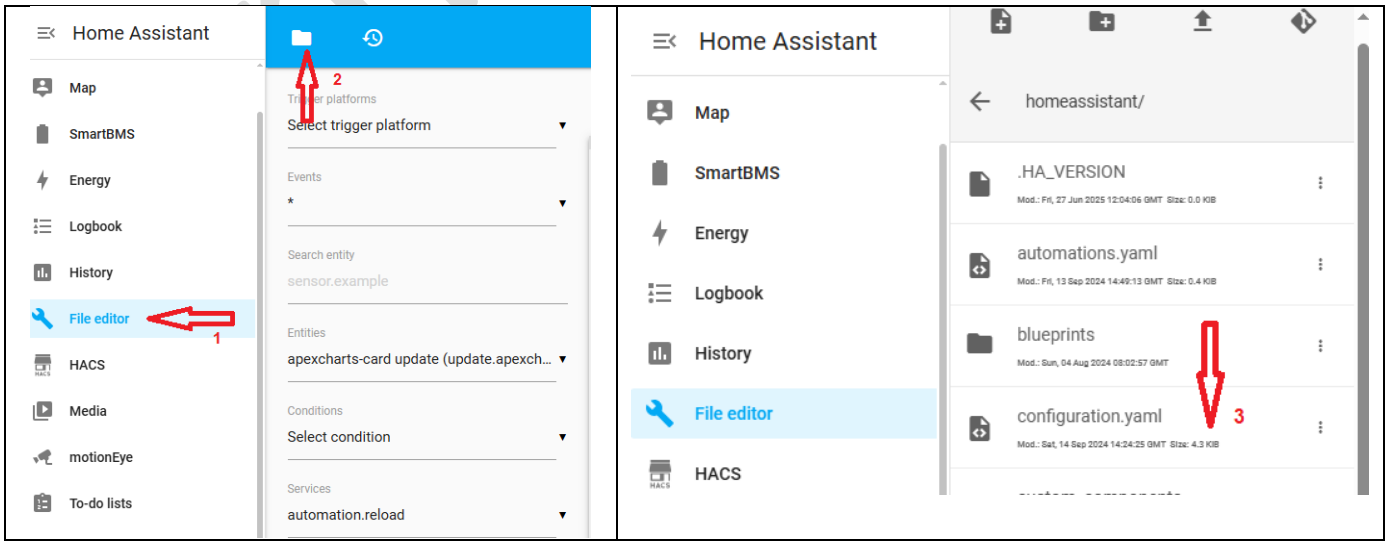
```
mqtt:
 sensor:
  - name: Status of Charge
    unique_id: status_of_charge
    state_topic: "Jsn"
    unit_of_measurement: "%"
    value_template: "{{ value_json.SOC }}"

  - name: Average mVolts on Cells
    unique_id: average_mvolts_on_cells
    state_topic: " Jsn "
    unit_of_measurement: "mV"
    value_template: "{{ value_json.AMV }}"

  - name: Pack Volts
    unique_id: pack_volts
    state_topic: " Jsn "
    unit_of_measurement: "V"
    value_template: "{{ value_json.PMV }}"
.......
.......
```

Cut & Paste the "configuration-addon.yaml" content into you configuration.yaml file.

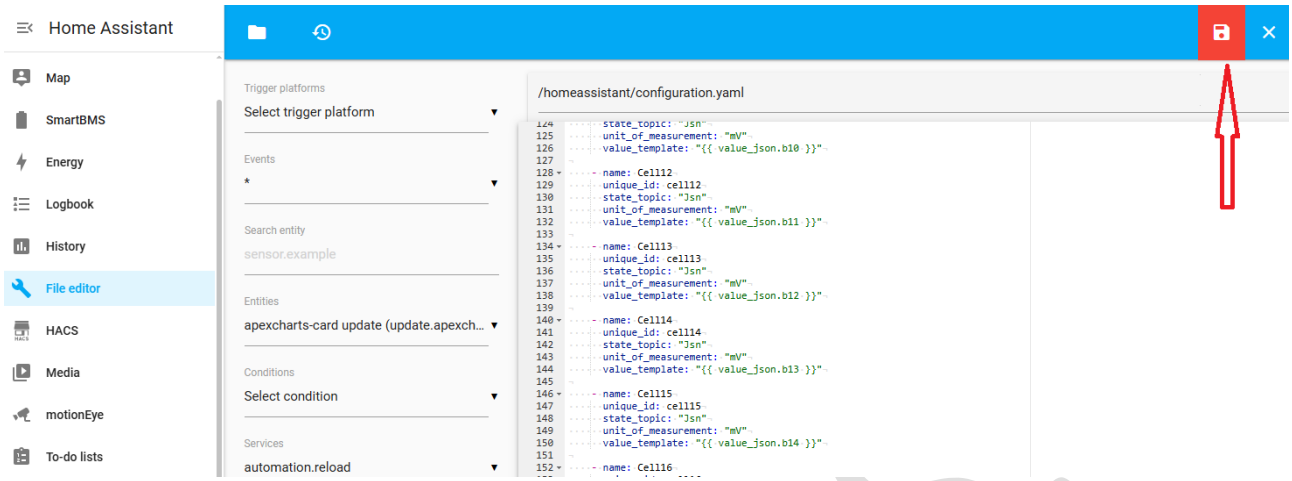
As you can notice:
HA state_topic: "Jsn" == Dongle PUBLISHED JSON Topic
HA value_json.XXXX == Dongle Published fields



EDIT YOUR CONFIGURATION.YAML



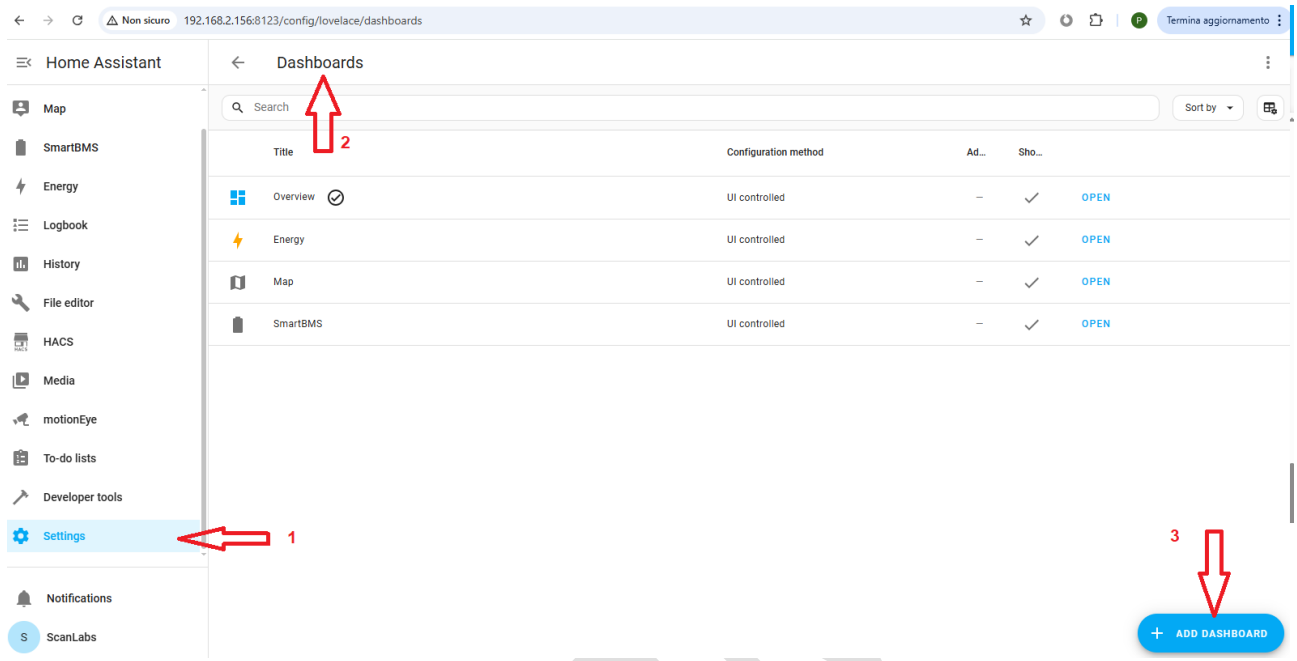
COPY the modified "*configuration-addon.yaml*" into your HA configuration.yaml file
Press on Save Icon when done



SmartBMS.

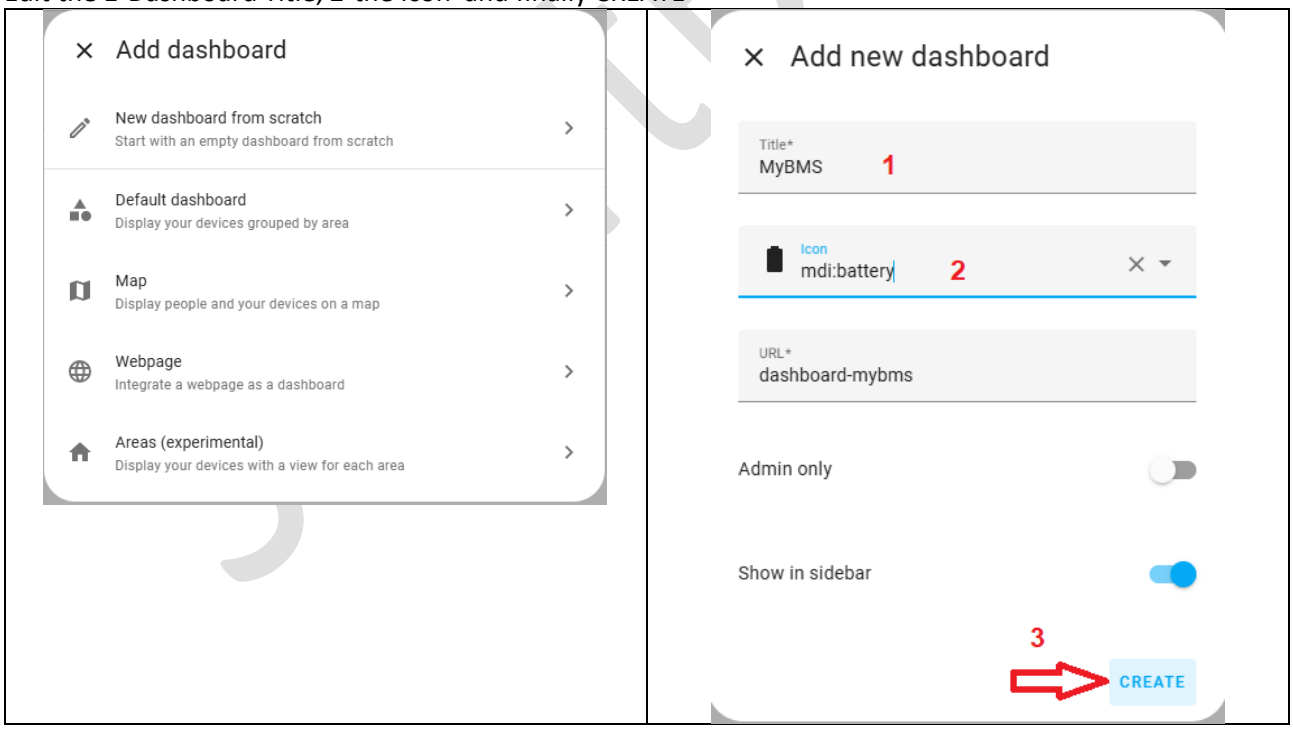
CREATE YOUR SMART BMS DASHBOARD

GO to “Settings”-> “Dashboard” -> “+ ADD DASHBOARD”

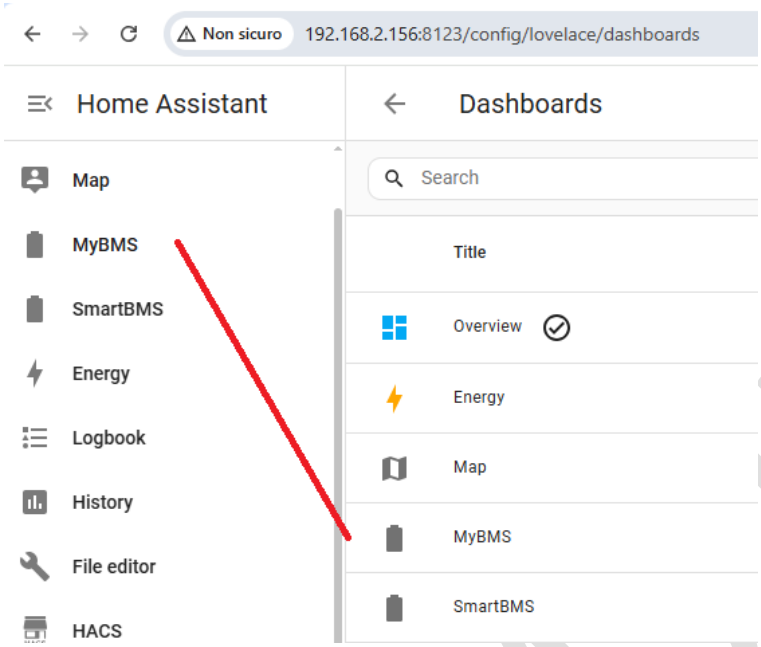


➔ “Default dashboard”

Edit the 1-Dashboard Title, 2-the Icon and finally CREATE



The fresh new Dashboard is added on the left column of HA console



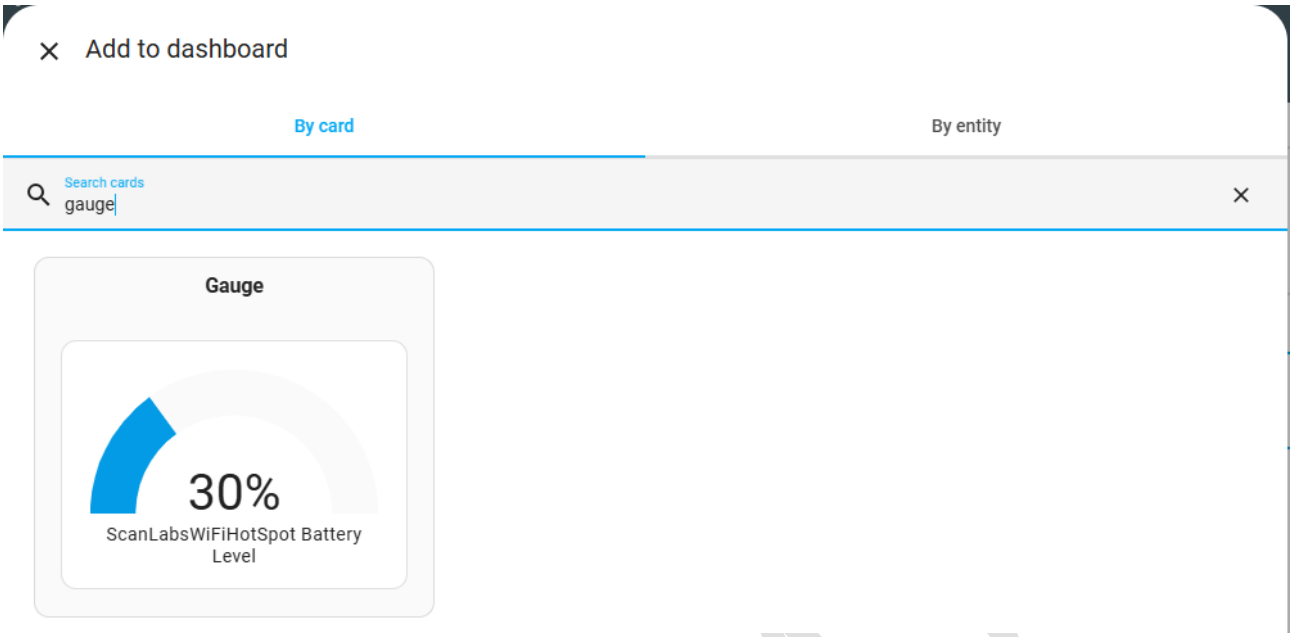
Click on the Dashboard Name and to the pen-icon to start editing



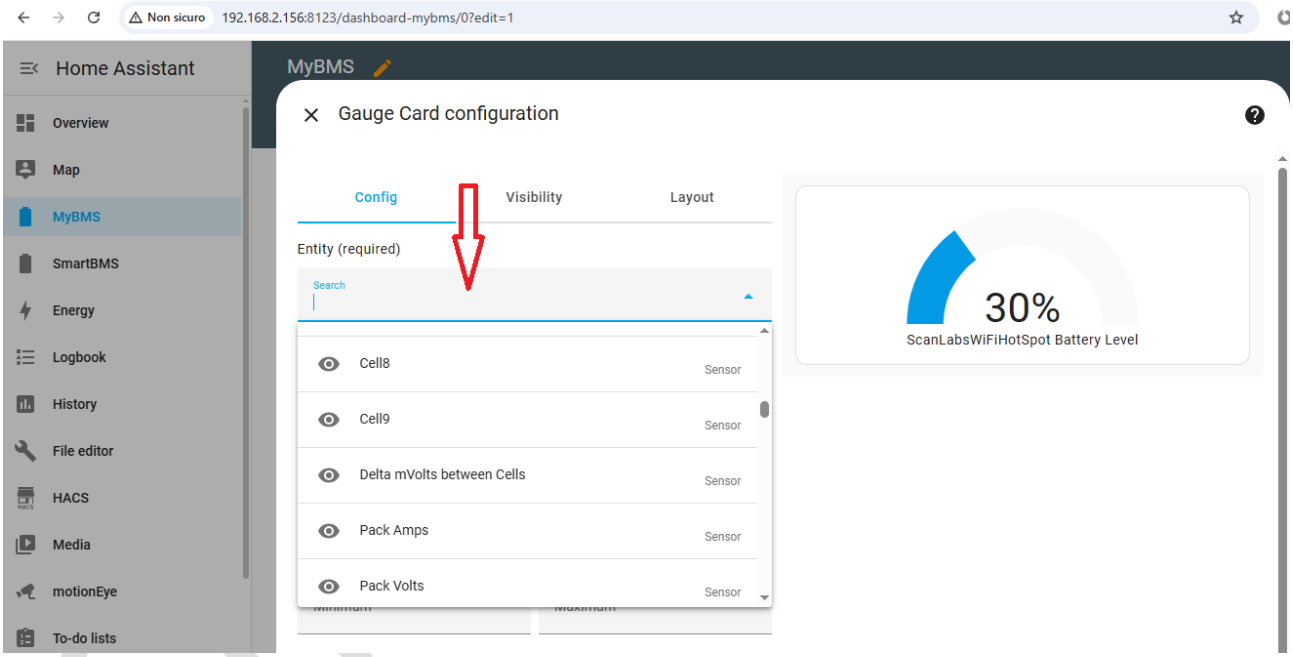
Add a New Section



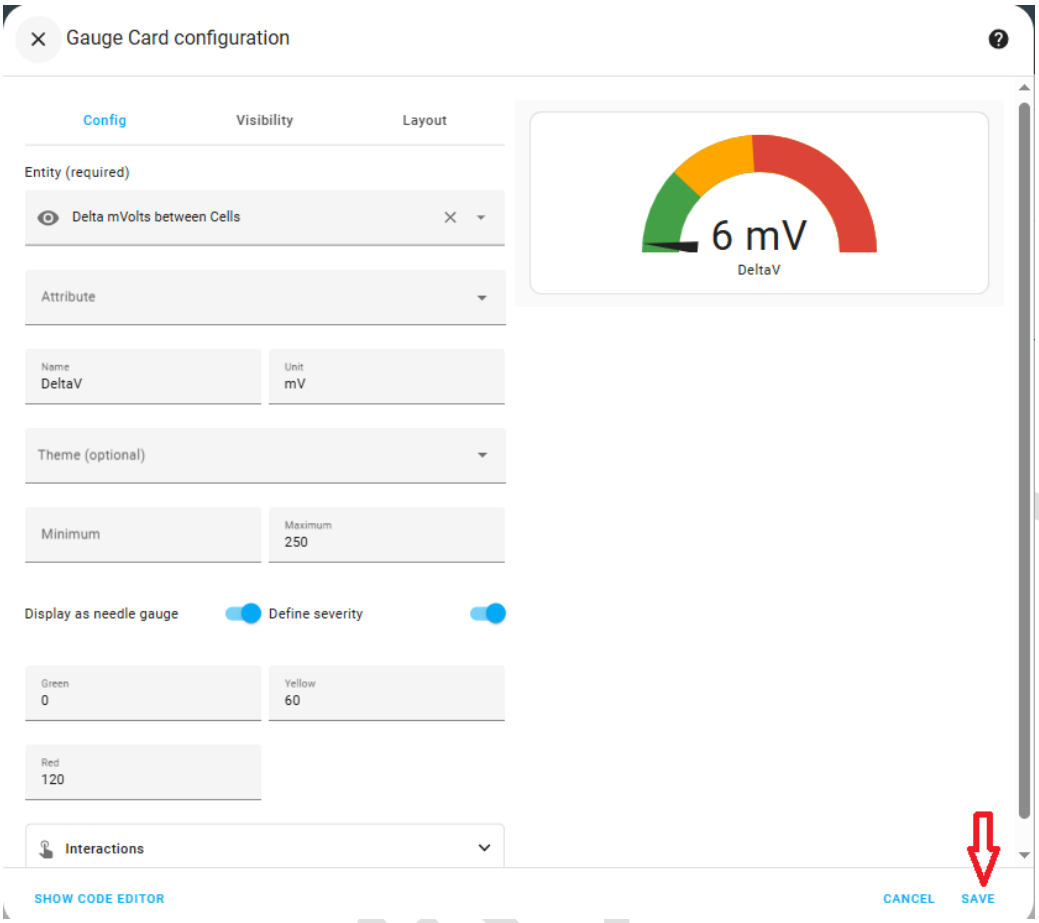
AS EXAMPLE, select a GAUGE CARD to visualize a BMS parameter



On the “Entity” fields you must to search for the same names added via the configuration-addon.yalm file



EXAMPLE showing “Delta mVolts between Cells” via a GAUGE CARD
When setup is done – click on SAVE


Gauge Card configuration
Config
Visibility
Layout
Entity (required)
Delta mVolts between Cells
Attribute
Name
DeltaV
Unit
mV
Theme (optional)
Minimum
Maximum
250
Display as needle gauge
Define severity
Green
0
Yellow
60
Red
120
Interactions
SHOW CODE EDITOR
CANCEL
SAVE
6 mV
DeltaV

Smart

TASMOTA COLOR DISPLAY with ScanLabs BMS Data Extractor

v3.1 09-08-2026

Following this basic tutorial, you will be able to build and configure a colour-graphic WiFi display based on the TASMOTA project.
From config files version >=3.0, the Colour Display connects via **Wi-Fi and MQTT(s)** to the MQTT broker and/or via **MODBUS TCP** directly to the ScanLabs Dongle when MODBUS Server is enabled.

With the color display you can monitor one or many battery packs info.



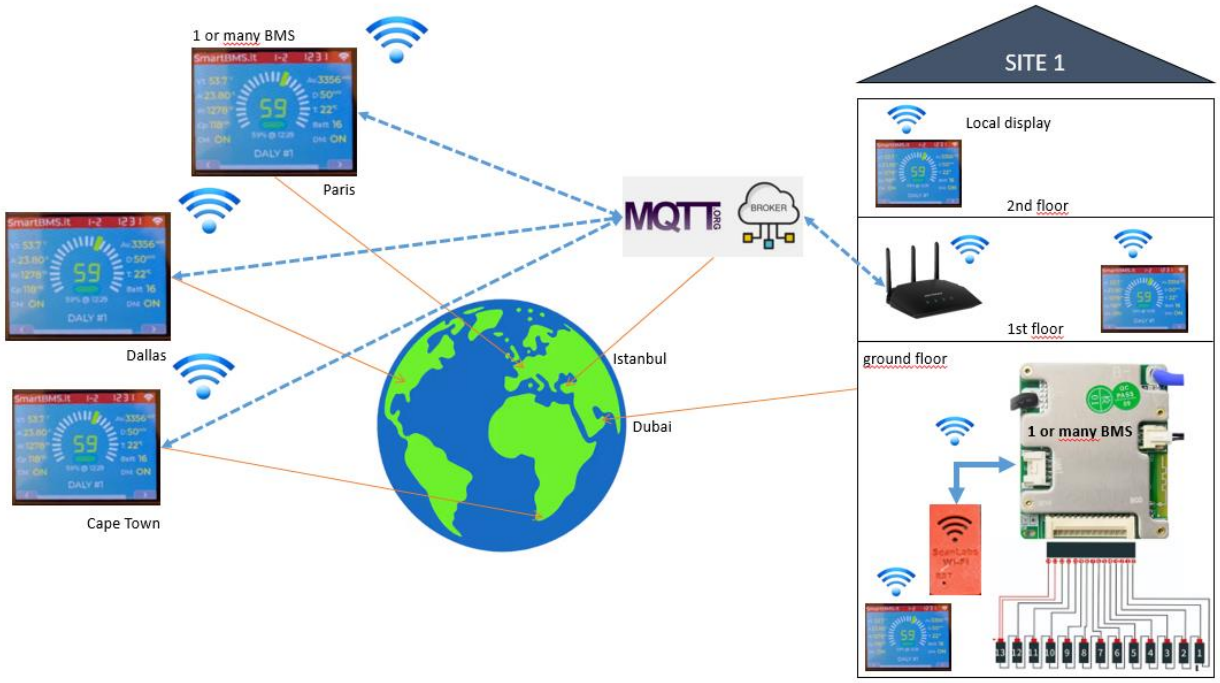
Total project cost is about 15$ (for the display & enclosure) + 2$
Time to make it: 10 minutes (if you follow this tutorial ;-))
Time to print stl: 2-3h (depending on you 3D printer)
What you need:

- 1 or many* ScanLabs dongle/s to extract DALY/JK BMS data and Publish to an MQTT server
- 1 or many**
  - **ESP32-2432S028r** -> Colour Display based on ESP32 – 2.8inches
  - **ESP32-3248S035** -> Colour Display ESP32 -3.5inches (Link)
- 1 or many* Enclosure for the Colour Display (2.8inches – 3.5” on the way)
  - Free STL option 1 2.8”
  - Free STL option 2 2.8”
  - Free STL option 3 2.8”

Why 1 or many?
*One display can show multiple Battery Packs on multiple Dashboards (pages on the display) .
Each battery pack has its own ***DashBoard ID***. BMS could also be located on different cities and from different type/vendors.
**Being an MQTT based display you can build as many as you want, all of them will show the same info even on different places of the world or the house (where Wi-Fi connectivity to internet is available)
** Using MODBUS connectivity I can estimate that max 3 Displays can be directly connected to one ScanLabs Dongle. MODBUS is typically used for local Point to Point WiFi link even without Internet connectivity.

One BMS – Internet Connection – 1 or More colour Display MQTT

One dongle monitors one BMS, the dongle in Wi-Fi connected to the AP able to reach internet.
Via MQTT you can install as many display you needs located everywhere there is an internet Wi-Fi connection.
(locations reported hereunder were randomly selected just for the sake of the explanation)



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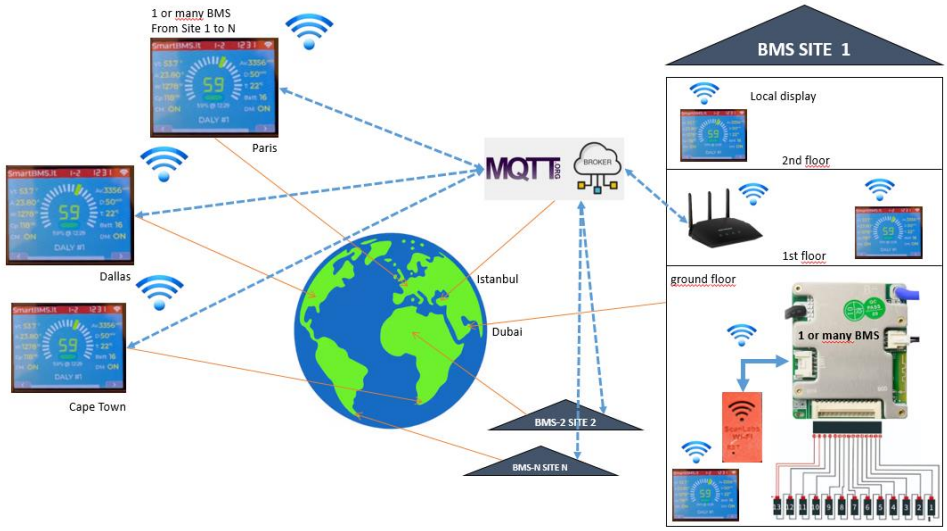
MULTIPLE BMS – Internet Connection – 1 or + colour Display MQTT

Multiple BMS – same model or from different vendors, same or on different locations , does not care.
Each BMS access Internet via the ScanLabs Smart BMS data extractor to the SAME MQTT Broker.
You can install as many display you need located everywhere there is an internet WiFi connection.
Multiple BMS are shown on different pages on the display; you can let them scrolling automatically or select your preferred view.



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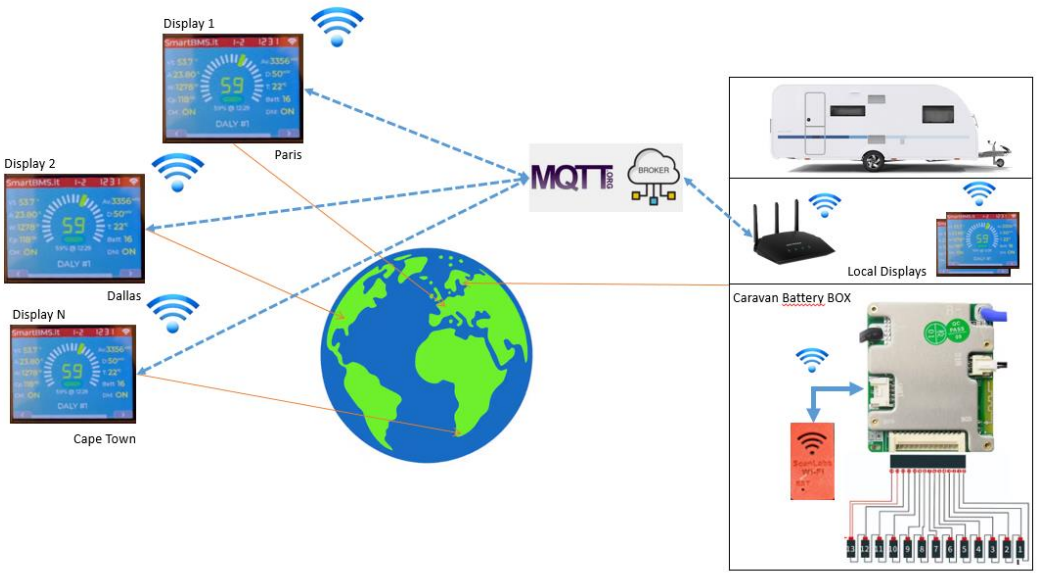
CARAVAN – BOAT – CHALET – WITH INTERNET CONNECTIVITY

Same comments as for scenario 1



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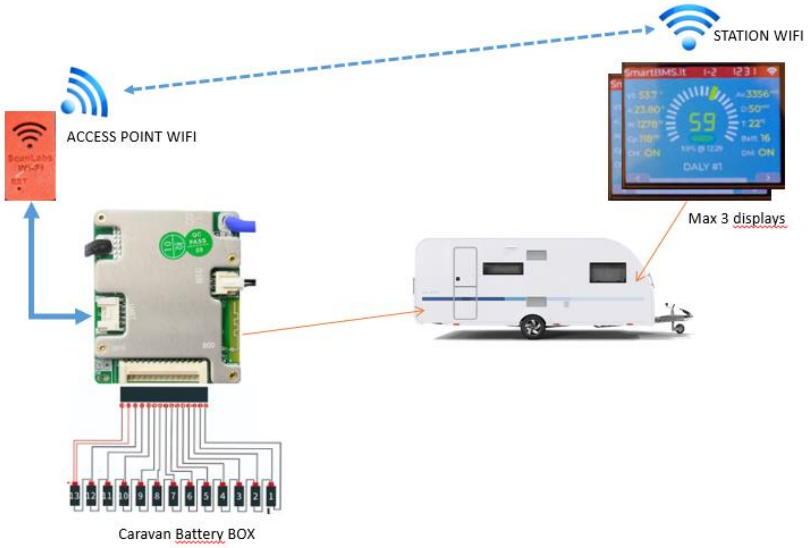
CARAVAN – BOAT – CHALET – WITHOUT INTERNET CONNECTIVITY

If you do not have Internet connectivity OR you don't want to use an MQTT broker you can configure the ScanLabs BMS Smart data Extractor as a WiFi Access Point, let 1 to 3(MAX) display connect to it using MODBUS TCP direct connection.



Smart

QUICK INTRO to TASMOTA is an open source project that allows creating graphical Dashboard.
Multiple display are supported, even bigger in inches. You can adapt this job to different panels. What you need is to be inspired by the "*pages.jsonl*" dashboard configuration and by the "autoexec.be" Berry script file for unpacking MQTT and show the data.
Add your stuffs and customize your dashboard.
Let us MAKE IT!

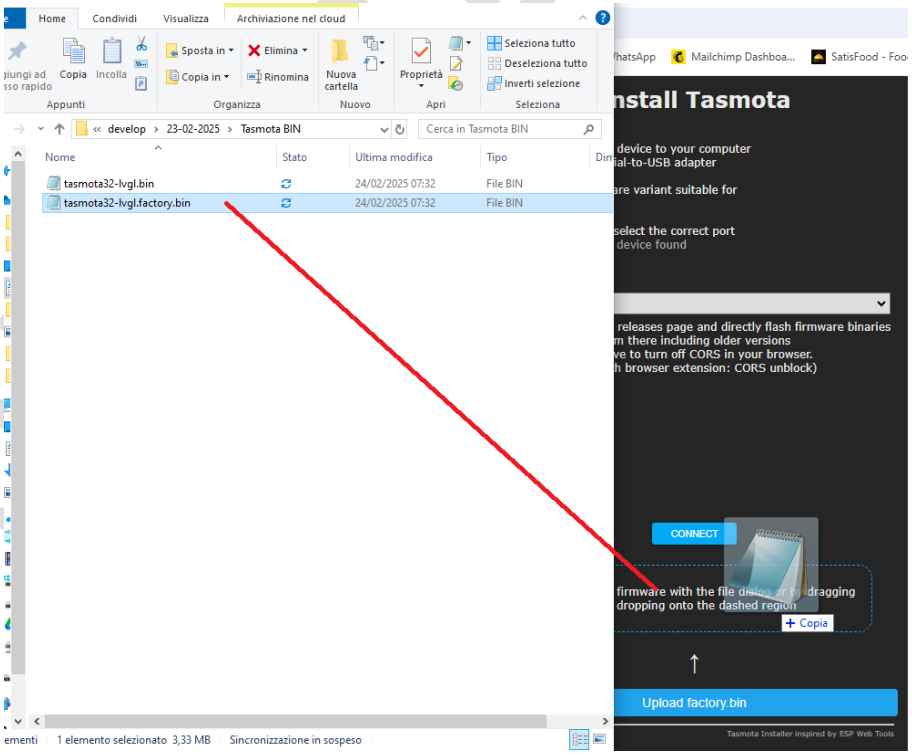
BUILD IT STEP-BY-STEP GUIDE

BEFORE TO START: the display ESP32-2432S028r is very nice and cheap BUT is missing of enough RAM to manage more than ONE BMS Dashboard .
Adding 4MB PSRAM is about easy and highly recommended if you want to monitor BMS or if you want to use charts.
Moreover, the display has a trivial mistake on the light sensor. If you want to let the brightness of the display according to the ambient light, you need a basic modification.
For Both the HW modification goes to APPENDIX B.

We need **TASMOTA LVGL** graphic libraries for this project.
Even if you can download the TASMOTA binaries from http://sidweb.nl/tasmota32/ and rebuild, you need to enable some compilation flags.
You can use this binary already built : ScanLabs Eng. Tasmota build (14.6.0.2 – lvgl-haspmota)

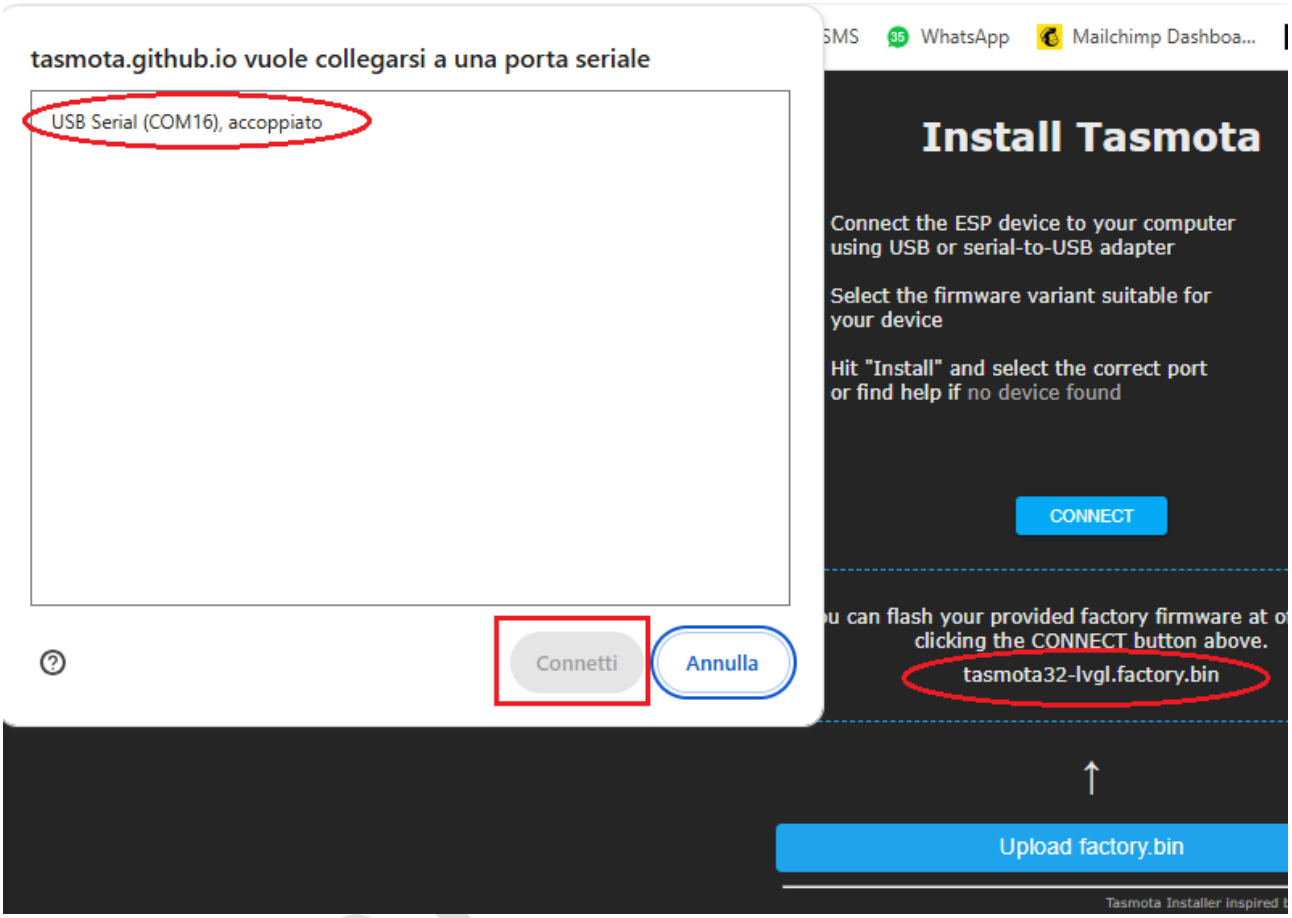
1- Open https://tasmota.github.io/install/

2- Drag & drop **tamosta32-lvgl.factory.bin** into the BOX like in the image



3- connect ESP32-2432S028r via USB type B or C to your computer
4- Press on "CONNECT" on the TASMOTA WebPage

5- A popup open with the list of the COM Port detected.
   a. Select the one belonging to the display.
   b. Press on “Connect”



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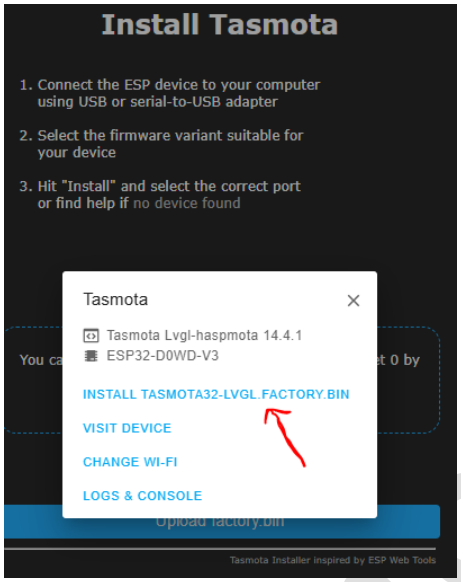
6- When the next popup appears select “INSTALL TASMOTA32-LVGL.FACTORY.BIN”



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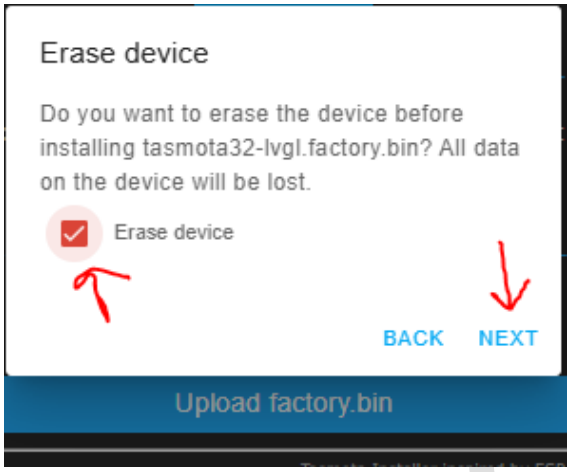
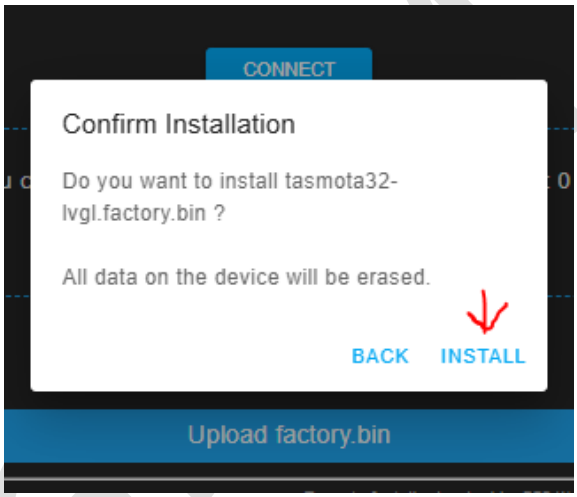
Select “ERASE ALL”

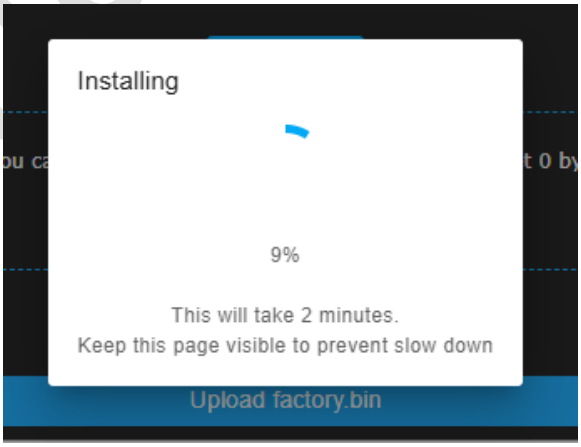
7- Select “NEXT”



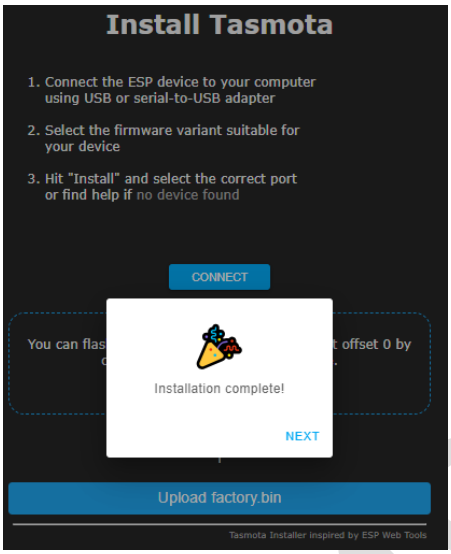
8- Click on “INSTALL”



9- Be patient, it takes about 2 minutes to upload the firmware on the display

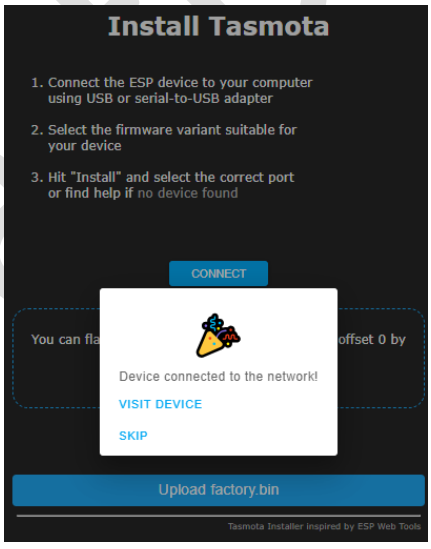


10- If all goes right you'll land here – Press "NEXT"



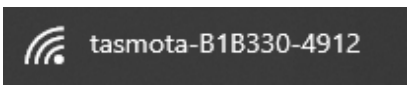
11- You will asked for your WiFi SSID and Password. Enter it

12- If everything was ok adding your wifi credentials the following message is show: "Device connected to the network !"
Click on "VISIT DEVICE"



NOTE: If you were wrong with WiFi Settings, you can follow these steps :

1- Power Cycle the Color Display
2- With your PC or mobile Scan for WiFi networs looking for "tasmota-XXXXXX-XXXX"
For instance – like this



3- Once connected go with your PC to the http://192.168.4.1

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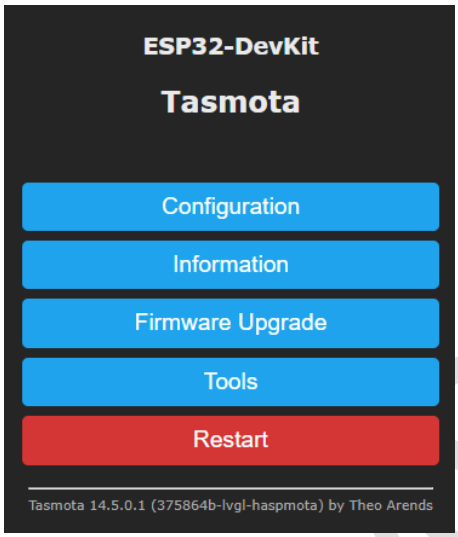
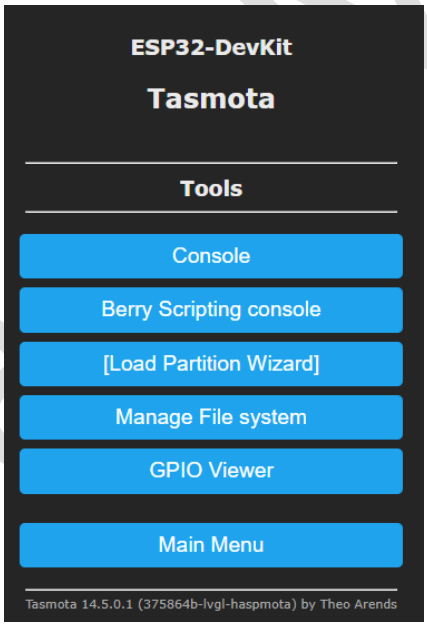
13- The following web page open
Take note of the Display IP Address assigned by your router on the top of the web page
Click on "TOOLS"



14- Click on "**Manage File system**"



15- From HERE download the file "***ScanLabs Tasmota.zip***" unzip it .
NOTE: The same package is on the dongle FW package

in /configuration/ **NOTE**: select the folder corresponding to your display type/size	"autoexec.be" "display.ini" "pages.jsonl" "template.jsonl" "DisplayCalibrate.tapp" "script.txt" "chart.jsonl"	-> Main file doing the ***dirty*** job -> Initialization of the display -> Main dashBoard Layout -> Template for generating the BMS dashboard -> File for touch calibration -> MODBUS file descriptor -> Chart Dashboard builder

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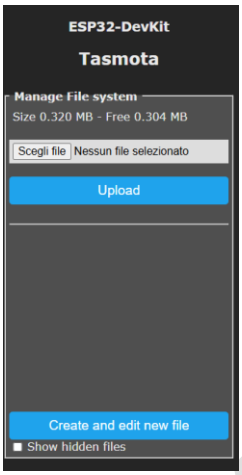
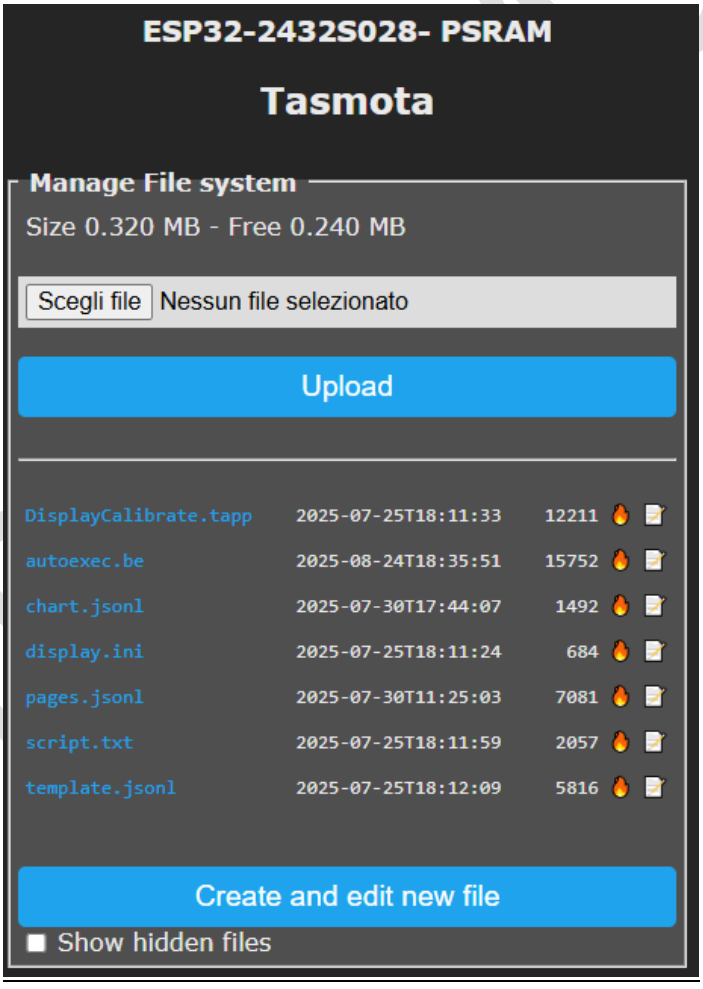
16- Upload on the display file system ALL the files in “configuration” folder . “Select File” for each of them and “Upload” one by one





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17- Go to : **“Tools -> Main Menu -> Configuration -> Other”**

a. COPY the following:

i. 2.8” display if you DO NOT HAVE extra PSRAM
{"NAME":"ESP32-2432S028","GPIO":[6210,1,800,0,448,0,1,1,672,704,736,768,449,1,1,1,0,992,1,1,0,737,48,0,1,0,0,0,705,10944,4704,1,11008,0,0,673],"FLAG":0,"BASE":1}

ii. 2.8” display if YOU HAVE added extra PSRAM (ANNEX B)
{"NAME":"ESP32-2432S028-PSRAM","GPIO":[6210,1,800,0,448,0,1,1,672,704,736,768,1,1,1,1,0,992,1,1,0,737,480,1,0,0,0,0,705,10944,4704,1,0,0,0,673],"FLAG":0,"BASE":1}

iii. 3.5” display if you DO NOT HAVE extra PSRAM
{"NAME":"esp32-3248S035C","GPIO":[0,1,800,6210,320,1,1,1,672,704,736,768,321,322,1,1,0,0,1,1,0,1,1,992,0,0,0,0,608,640,1,1,1,0,1,1],"FLAG":0,"BASE":1}

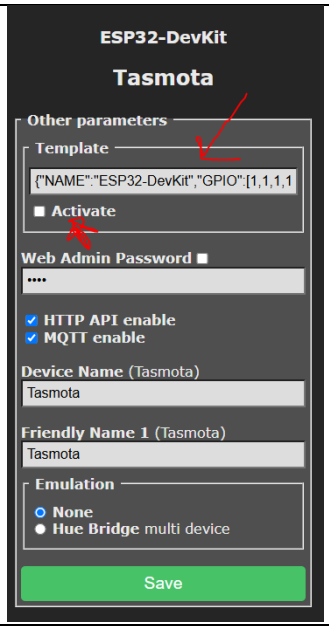
iv. 3.5” display if YOU HAVE added extra PSRAM (ANNEX B)
{"NAME":"esp32-3248S035C-PSRAM","GPIO":[0,1,800,6210,320,1,1,1,672,704,736,768,1,1,1,1,0,0,1,1,0,736,1,992,0,0,0,0,704,10944,1,1,11008,0,1,672],"FLAG":0,"BASE":1}

b. Place the string on the “**Template**” box

c. Click on “**Activate**”

d. Click on “**SAVE**” at the bottom

A display reboot will be issued automatically.



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18- At this point, rebooting the display you should be able to see the DASHBOARD.
If not repeat points from pt 16.

NOTE: I have found different displays on the market looking the same but with some differences. If after the reboot you see wrong colors , mirrored screen or even rotated screen or with corrupted lines … you can try to use the alternative display.ini file on the "other" folder available on "***ScanLabs Tasmota.zip***"
IF you still have problem, link with me via DISCORD or FORUM, I will help.

NOTE 2: Many are asking for larger displays, there's no limit indeed . display.ini and the page templates needs to be fixed in order to adapt them to the size and resolution.
Please link with me to build a collection of setup file.

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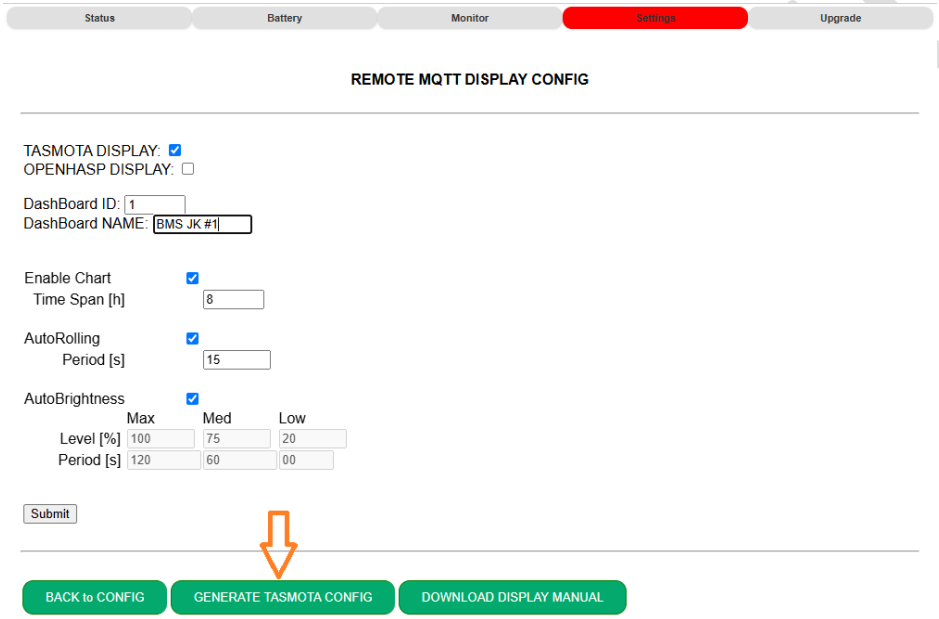
CONFIGUATION OF THE DISPLAY
for MQTT USERS

NEWS: From Display configuration file (autoexec.be) version 5.0 you can follow this alternate way for configuring MQTT.

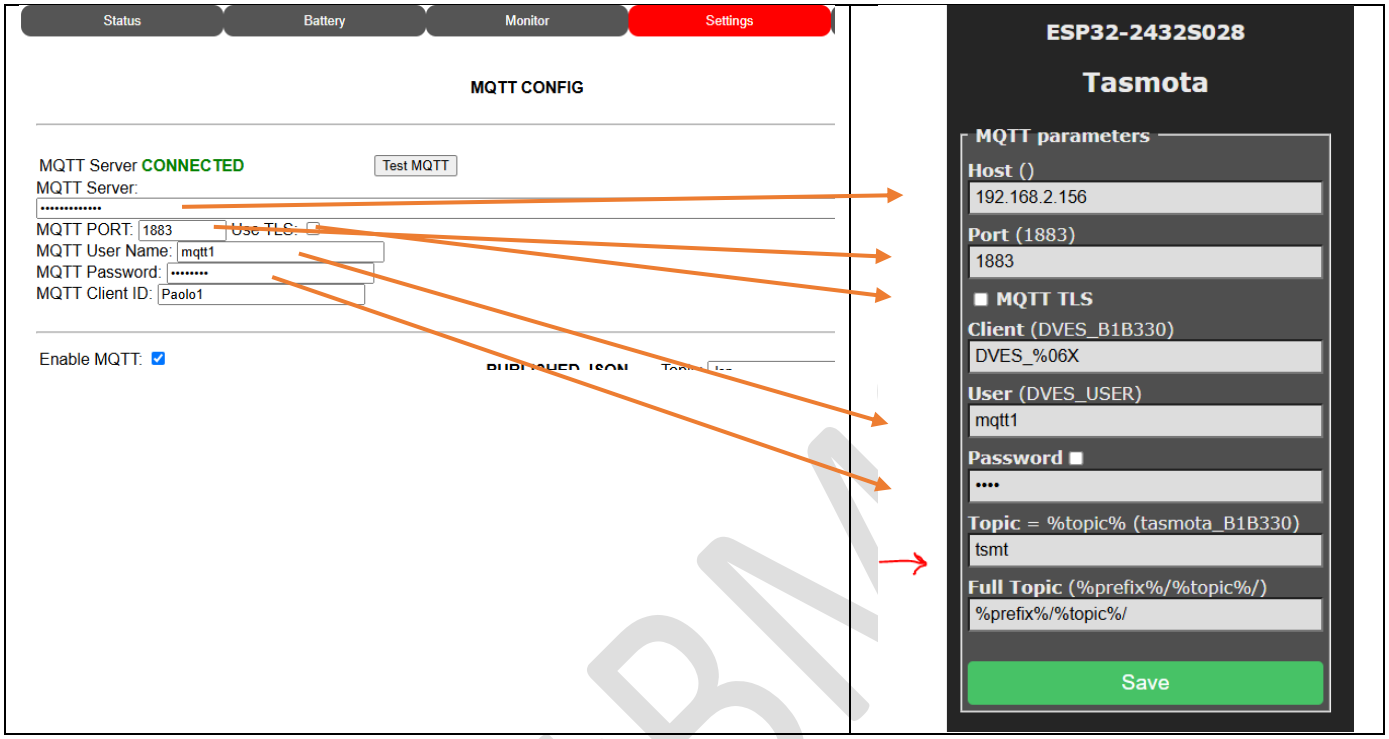
1- Go to the dongle -> Settings -> “DISPLAY”, at the bottom click on “GENERATE TASMOTA CONFIG” . **DOWNLOAD** the file **“config.txt”**



2- Upload “config.txt” file to the DISPLAY “Tools” -> “Manage File System”
3- Reboot the display. If I did a good job , after the reboot your display will self-config with the same info stated on the “config.txt” file

IF YOU WANT TO CONFIGURE MQTT MANUALLY:

1- From MAIN menu click on "**CONFIGURATION**" -> "**MQTT**"
Here you need to copy EXACTLY the data you have added into the ScanLabs dongle.



2- In the "***Topic***" field set "tsmt"
3- Save

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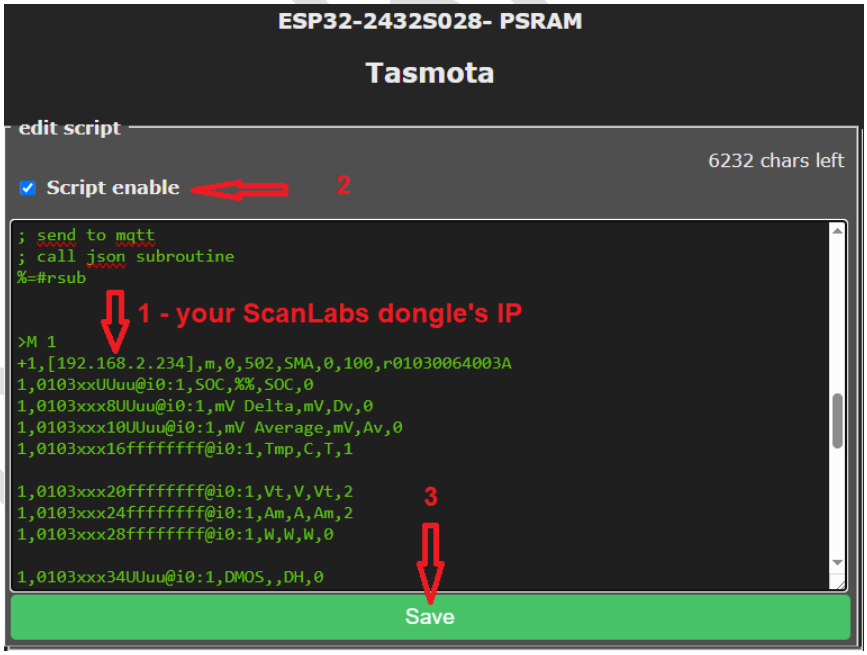
CONFIGUATION OF THE DISPLAY
for MODBUS USERS

A configuration file called **"script.txt"** is given to make your life easier ;-)
The only thing you need to do is to set your MODBUS Server IP and PORT
MODBUS Server IP could be the ScanLabs dongle itself (if you have enabled the ModBus Server on it) OR Any Other MODBUS Server exposing the data like the ScanLabs MODBUS Server does and like the script is looking for and like.

1- Go to "***Tools***" -> "***Edit Script***" find the line on the script as follow
REPLACE "192.168.2.234" with your ScanLabs dongle IP address.

>M 1
+1,[**192.168.2.234**],m,0,502,SMA,0,100,r01030064003A

NOTE: if you have set the ***SSBdE*** as AP, the default IP address is **192.168.0.1**
NOTE**:** ***SSBdE*** expose an MODBUS Server on Port 502 – if your Server uses a different port – fix it accordingly



2- Click on "***Script enable***"

3- Click on "***Save***" button

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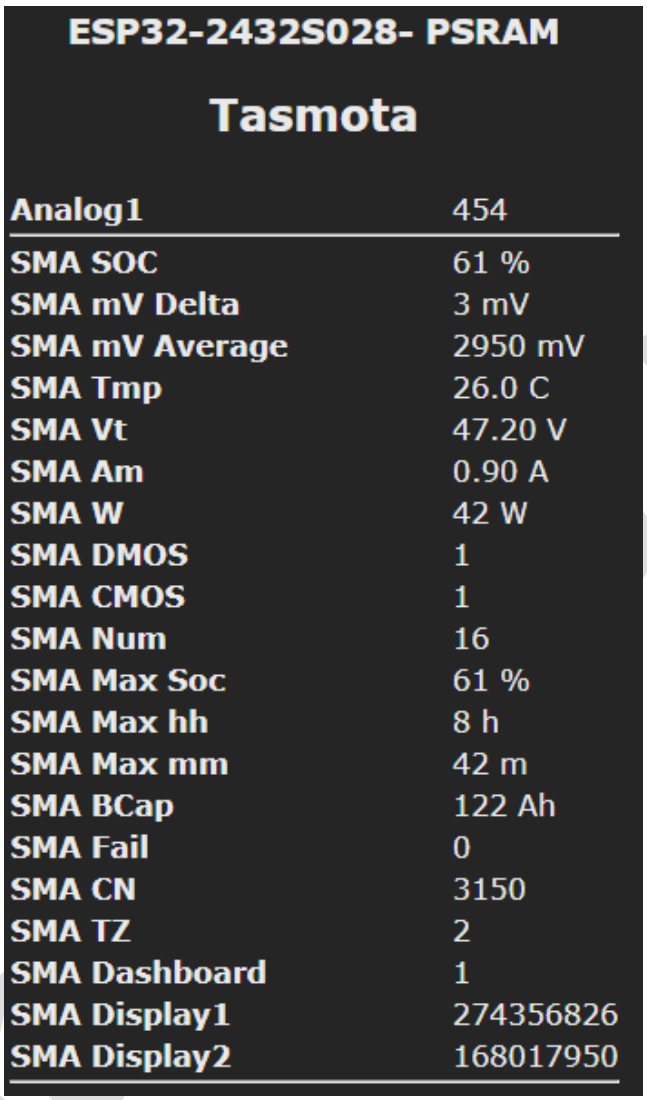
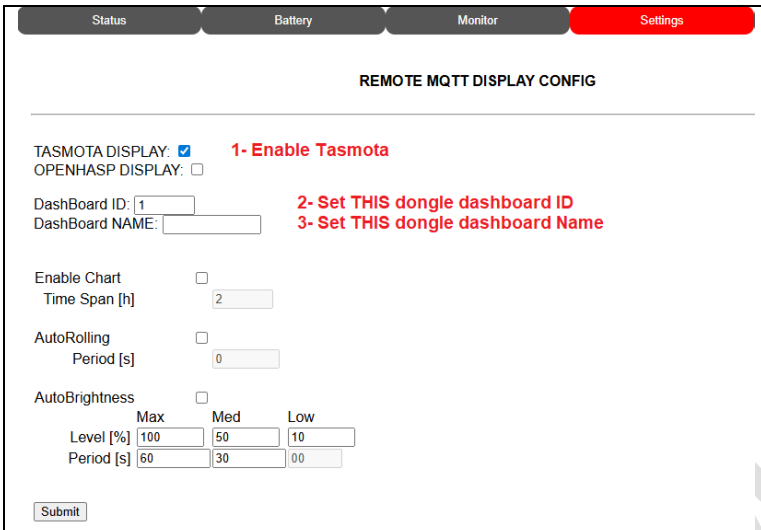
When / if the Smart Meter Script is activated and running, on the TASMOSTA main Web Page you will find



21- On the ScanLabs dongle : “SETTINGS” -> “DISPLAY” enable “TASMOTA DISPLAY” + “SUBMIT”



Each Display can show MULTIPLE BMS .
Each BMS has its own

- DashBoard ID
- DashBoard Name

Each ScanLabs dongle needs to export different DashBoard ID

ONLY the ScanLabs dongle exporting the DASHBOARD ID = 1 has the task for configuring the display behaviour for

- Show Chart
- Auto-Rolling
- Auto-Brightness

Show Chart: Display can show chart on selectable time window. NOTE Display with extra PSRAM are highly suggested especially if “Time Span” is larger than 1.
Auto-Rolling: is a way to let the display moving through the different Dashboards sequentially after ***Period*** seconds.
Auto-Brightness: when set, enable the lux sensor on the display to adjust automatically the display brightness. When DISABLED, the 3 Brightness levels on the table are considered

NOTE: Auto-Brightness needs display HW modification – See ANNEXA

22- Et voila’ – you are DONE !

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Changing WiFi credentials via Serial Console

On Serial TASMOTA Display, type the following with your data

Backlog SSID1 MyWiFi ; Password1 MyPass123 ; SaveData ; Restart 1

Parameter	**Command**	**Description**
Primary SSID	SSID1 <network_name>	Sets the main Wi-Fi network SSID
Primary Pass	Password1 <password>	Sets the main Wi-Fi network password
Backup SSID	SSID2 <backup_network_name>	Sets the secondary Wi-Fi network SSID
Backup Pass	Password2 <backup_password>	Sets the secondary Wi-Fi network password
Save Config	SaveData	Stores configuration into flash memory
Restart Device	Restart 1	Reboots the device to apply new settings

Changing WiFi credentials via Web Browser

http://192.168.4.1/cm?cmnd=backlog%20ssid1%20myssid;password1%20mypasswd;fulltopic%20%25prefix%25/USER1234/%25topic%25/

where 192.168.4.1 must to be changed accordingly with your display IP.

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ANNEX A
HOW TO SETUP MULTI-PAGES DISPLAY

NOTE: ESP32-2432S028r has not enough RAM to manage large haspmota – pages.json configuration file.

If you want to have more than one Dashboards on your display OR if you want to add CHARTs it's a MUST to **add 4MB PSRAM** – it requires an almost trivial HW modification – See ANNEX B

From ScanLabs-TASMOSTA configuration files version 3.0 -> every time a new battery pack is detected – it is automatically added to the Display DASHBOARDs.

REMEMBER: You also have to configure each ScanLabs BMS data Extractor to export a different Dashboard ID .
Dashboard ID == Page ID

REMEMBER: Dongle with DashBoard ID = 1 is the master – only this dongle set the other parameters like display brightness behaviour or DashBoards rolling pages behaviour.

REMEMBER: Each ScanLabs Dongle MUST use the same MQTT broker (same mqtt setup) to let the TASMOTA display to show multiple BMS
See a Video here ;-)

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ANNEX B
HW MODIFICATION

ADDING 4MB PSRAM

Thanks and applauses goes to hexeguitar. Reported hereunder are the results of his work.
NOTE: There are different HW around, the one on the image is very old – please go till the end of this description, I add my 2 cents to hexeguitar job to make it applicable modern display.

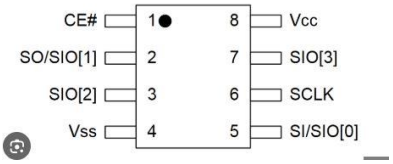
PSRAM MODELs

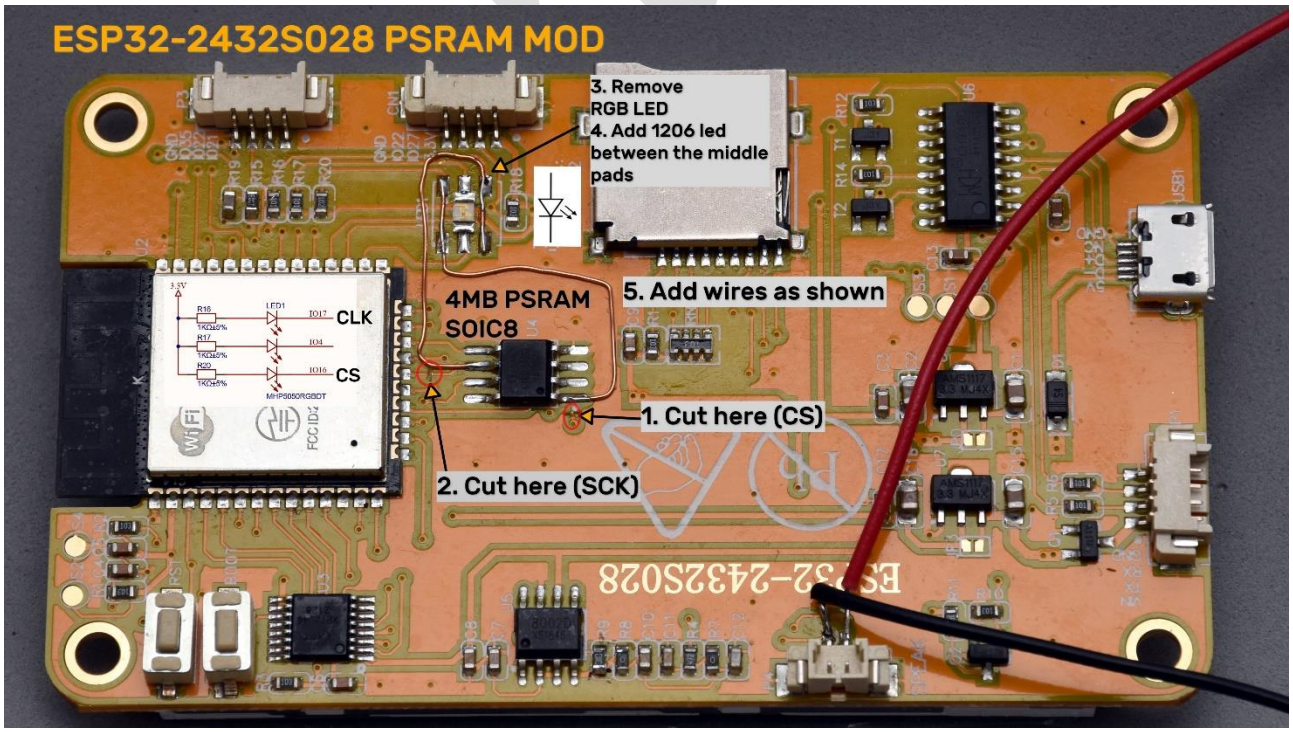
Suitable PSRAM chips:

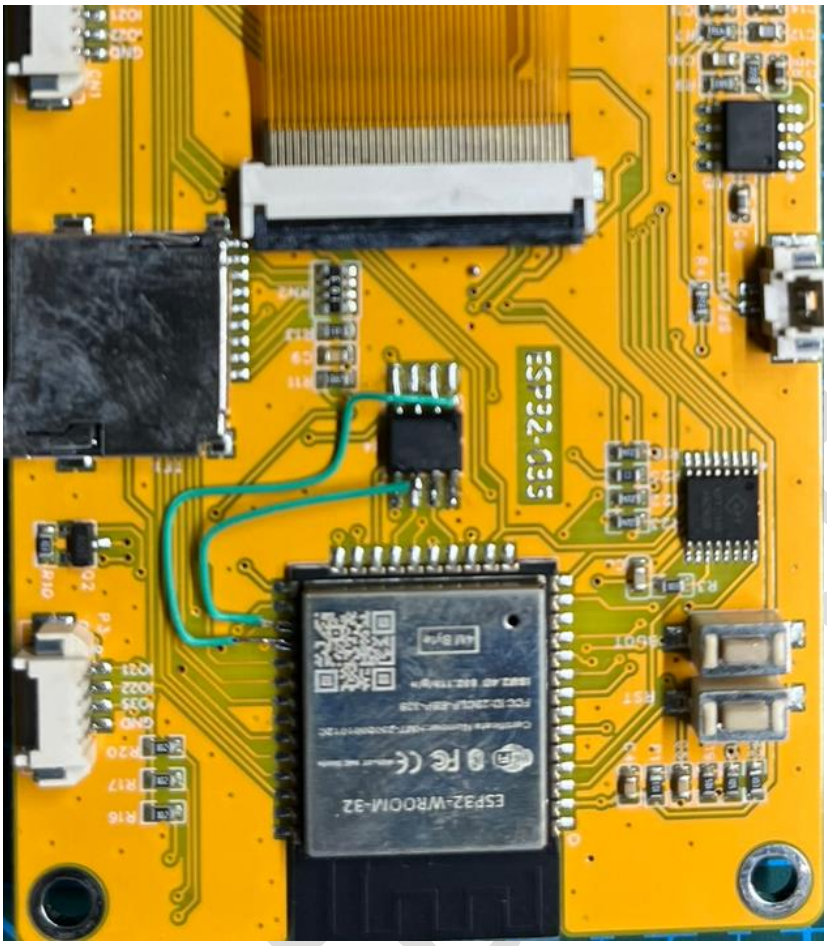
- APS6404L-3SQR-SN - 64Mbit (8MB) version, ESP will map only half of it. (Mouser# 878-APS6404L-3SQR-SN)
- APS1604M-3SQR-SN - 16Mbit (2MB) version, probably enough for audio streaming and decoders. (Mouser# 878-APS1604M-3SQR-SN)

Important! - it has to be the **3**SQR version. Models without **3** are 1.8V ones. Won't work in the Display.

APS6404L-3SQR-SN Aliexpress Link







When Extra PSRAM is added, TASMOTA should automatically detect it **provided you have modified the CONFIGURATION file to add the missing signals.**

Cut and Paste on **DISPLAY -> Configuration -> Other** the following configuration:
Activate and Save

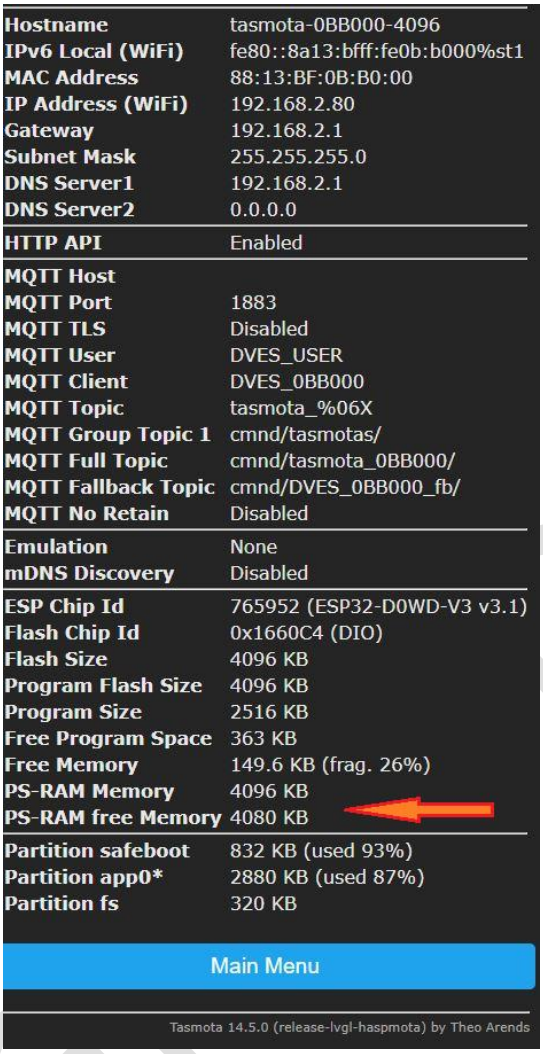
For 2.8” display

{"NAME":"ESP32-2432S028-PSRAM","GPIO":[6210,1,800,0,448,0,1,1,672,704,736,768,1,1,1,1,0,992,1,1,0,737,480,1,0,0,0,0,705,10944,4704,1,0,0,0,673],"FLAG":0,"BASE":1}

For 3.5” display

{"NAME":"esp32-3248S035C-PSRAM","GPIO":[0,1,800,6210,320,1,1,1,672,704,736,768,1,1,1,1,0,0,1,1,0,736,1,992,0,0,0,0,704,10944,1,1,11008,0,1,672],"FLAG":0,"BASE":1}

On the main TASMOTA webpage click on **information**, you should find PSRAM like here



Hostname	tasmota-0BB000-4096
IPv6 Local (WiFi)	fe80::8a13:bfff:fe0b:b000%st1
MAC Address	88:13:BF:0B:B0:00
IP Address (WiFi)	192.168.2.80
Gateway	192.168.2.1
Subnet Mask	255.255.255.0
DNS Server1	192.168.2.1
DNS Server2	0.0.0.0
HTTP API	Enabled
MQTT Host	
MQTT Port	1883
MQTT TLS	Disabled
MQTT User	DVES_USER
MQTT Client	DVES_0BB000
MQTT Topic	tasmota_%06X
MQTT Group Topic 1	cmnd/tasmotas/
MQTT Full Topic	cmnd/tasmota_0BB000/
MQTT Fallback Topic	cmnd/DVES_0BB000_fb/
MQTT No Retain	Disabled
Emulation	None
mDNS Discovery	Disabled
ESP Chip Id	765952 (ESP32-D0WD-V3 v3.1)
Flash Chip Id	0x1660C4 (DIO)
Flash Size	4096 KB
Program Flash Size	4096 KB
Program Size	2516 KB
Free Program Space	363 KB
Free Memory	149.6 KB (frag. 26%)
PS-RAM Memory	4096 KB
PS-RAM free Memory	4080 KB
Partition safeboot	832 KB (used 93%)
Partition app0*	2880 KB (used 87%)
Partition fs	320 KB

Main Menu

Tasmota 14.5.0 (release-lvgl-haspmota) by Theo Arends

If you do not see this section on the Information page either you were wrong on the HW modification itself or you have not applied the new configuration string.
Please check both

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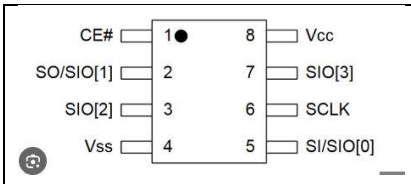
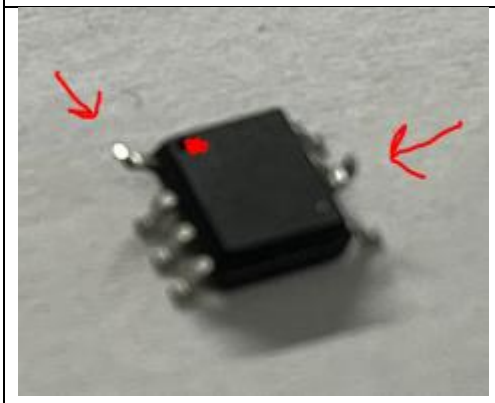
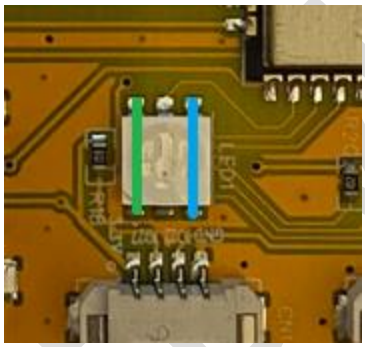
YOUR DISPLAY PCB LOOKS DIFFERENT ?

If your display PCB looks a bit different from the images OR you don't want to cut any line on the PCB I can suggest this easy-easy way :

	ONLY Pins 1 and 6 require an HW modification. Instead of cutting the tracks on the PCB you can simply – gently lift up the PINS 1 and 6 to let them don't touch the PCB pads while you will solder the PSRAM
	RGB Led can be left where it is at the cost of shorting pins on one side with the corresponding on the other side like in the image. The central pair can be left as is. 

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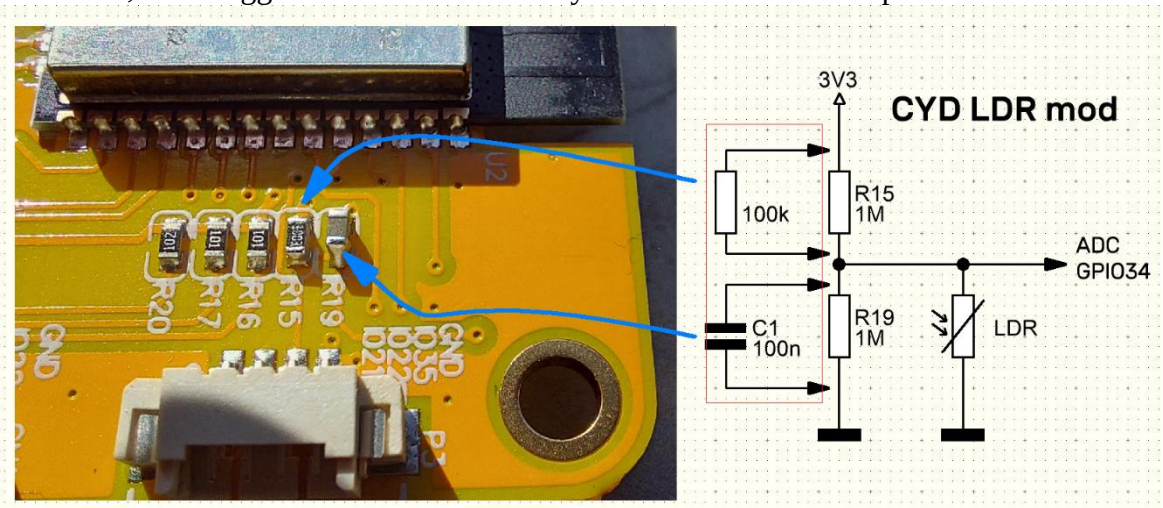
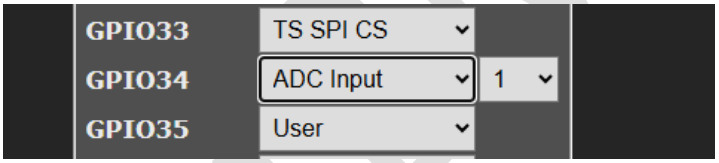
FIXING DISPLAY BRIGHTNES SENSOR

Thanks and applauses go to hexeguitar. Reported hereunder is the result of his work.
The fix consist on adding at least a 100Kohm resistor in parallel to R15 because 1Mohm mounted gives a wrong signal dynamic.
C1 100nF ceramic, even suggested is NOT mandatory because a kind of low pass filter is made in SW.



TASMOTA template file has to be fixed like this: GPIO34 -> ADC Input 1



To let the display using Auto brightness you need

1- From ScanLabs dongle enable the feature
2- Let the Light sensor of the display be exposed to the light



ANNEX C

DISPLAY TROUBLESHOOTING

DISPLAY ROTADED or STRANGE COLOR SCHEME

If your display looks rotated and/or with a different colour scheme try to modify your “display.ini” by changing the following lines

```
:H,ILI9341,240,320,16,SPI,1,,,,,,*,40
:r,1
:R,36
:0,40,00,00,05
:1,20,00,00,01
:2,80,00,00,06
:3,E0,00,00,00
```

For any other display issue, better to link with me and or support community via DISCORD

LARGER DISPLAY 480x320

Larger display are partially supported, still some fixing (you could complete yourself ;-))
Configuration files released as Beta version on the Fw package

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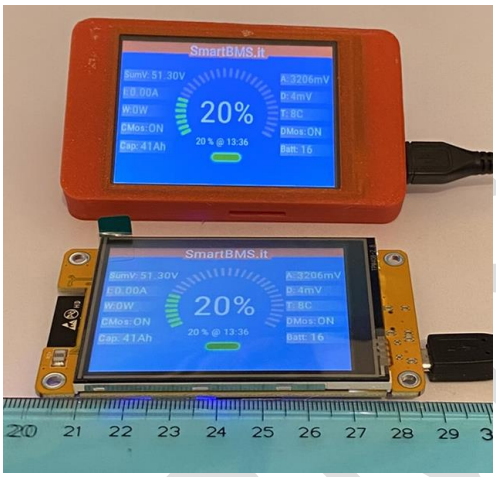
OPENHASP COLOR DISPLAY with ScanLabs Dongle

v1.1 02-25-2025

Following this basic manual, you will be able to build a colour-graphic display based on the openHASP project.
The Colour Display connects via Wi-Fi and MQTT to the MQTT broker you are using and will display major battery pack info.
NOTE: openHASP project does not support MQTT over TLS , if TLS is needed use TASMOTA project



Total project cost is about 15$ (for the display & enclosure)
Time to make it: 10 minutes (tanks to file exported by ScanLabs dongle)
Time to print stl: 2-3h (depending on you 3D printer)
What you need:

- 1 or many* ScanLabs dongle/s to extract DALY/JK BMS data and Publish to an MQTT server
- 1 or many** ESP32-2432S028r -> Colour Display based on ESP32 – 2.8inches
- 1 or many* Enclosure for the Colour Display
  - Free STL option 1
  - Free STL option 2
  - Free STL option 3

Why 1 or many?
*One display can show multiple Battery Pack on multiple Dashboards. Configure each battery pack to publish data on a dedicated Dashboard
**Being an MQTT based display you can build as many as you want, all of them will show the same info even on different places on the world or the house (where Wi-Fi connectivity to internet is available)
QUICK INTRO to openHASP is a free very cool project that make super easy creating graphical panels. Multiple display are supported, even bigger in inches. Get inspired by the "*scanlabs.jsonl*" dashboard configuration exported by the ScanLabs Dongle for BMS to make yours.
Add your stuffs and customize your dashboard.
Let us MAKE IT!

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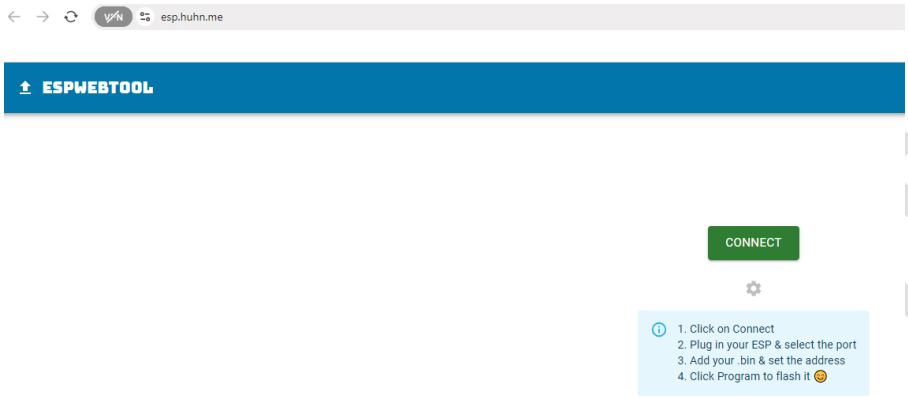
STEP-BY-STEP GUIDE

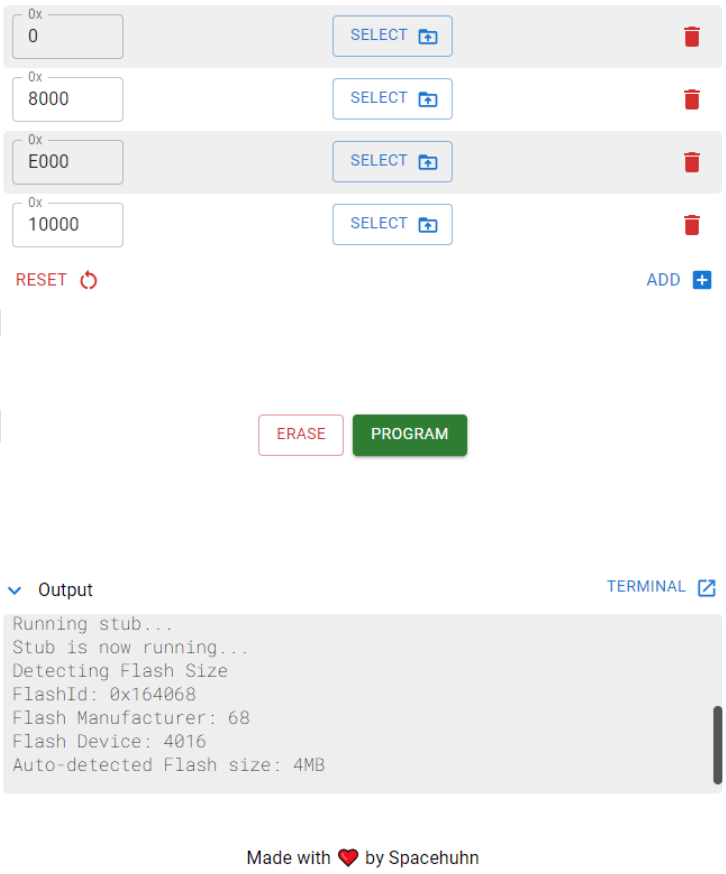
1- PROGRAM [ESP32-2432S028r] with openHASP 0.7.0 which binary I pre-build for you . [DOWNLOAD FROM HERE]

2- **Connect** the display through the ICD Port via an USB-Micro cable

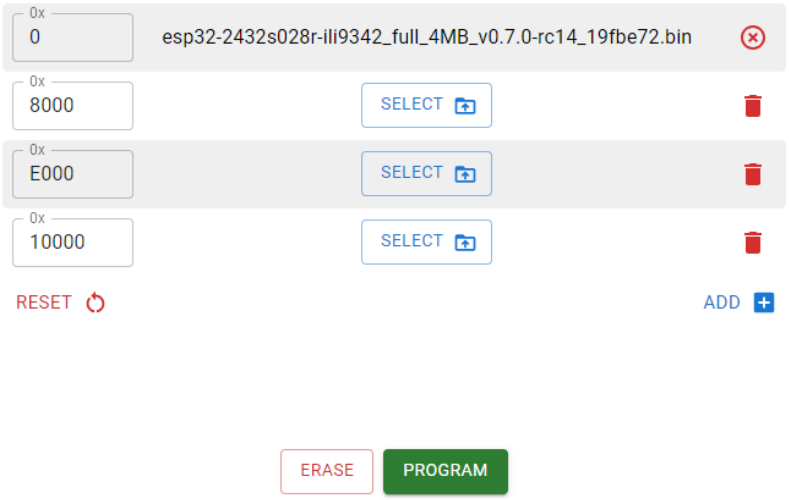
3- Go to [https://esp.huhn.me/] is an online tool that implement ESP32 loader. Press “CONNECT”



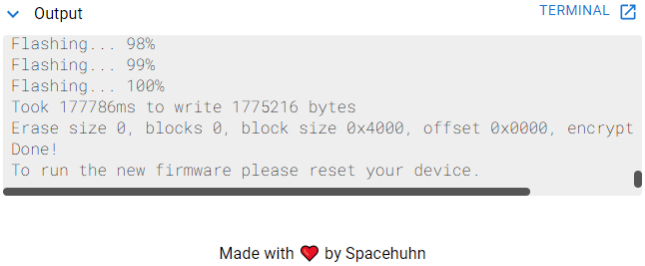
4- A pop-up box appear, select the COM port on which the display is connected If everything is ok you should see a picture like this:



5- AT address 0x0000 Select the file [esp32-2432s028r-ili9342_full_4MB_v0.7.0-rc14_19fbe72.bin]

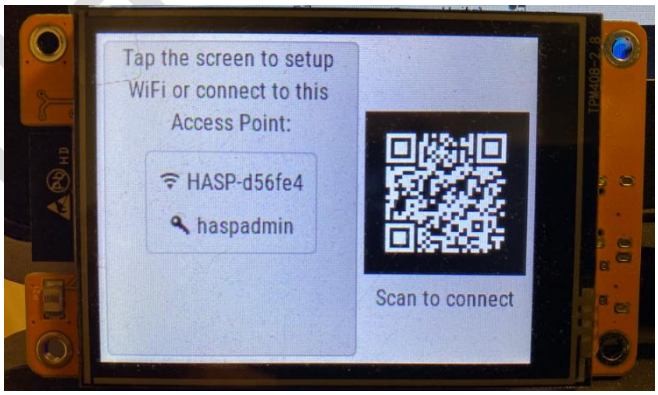


6- "ERASE"
7- "PROGRAM" …. Wait all the steps , it will take about 1 minute



8- Power cycle the display (unplug , wait 5s and re-plug the usb cable)

9- openHASP will Start showing a QRCODE to let you scan it and connect to the WiFi Network created
   a. SSID HASP-d56fe4 (your will be slightly different)
   b. Password: haspadmin



10- Once connected to the Wi-Fi, open an Internet Browser and go to page **http://192.168.4.1**
11- On the WebPage, **SET** your home Wi-Fi network **SSID** and **PWD** – "SAVE SETTINGS"

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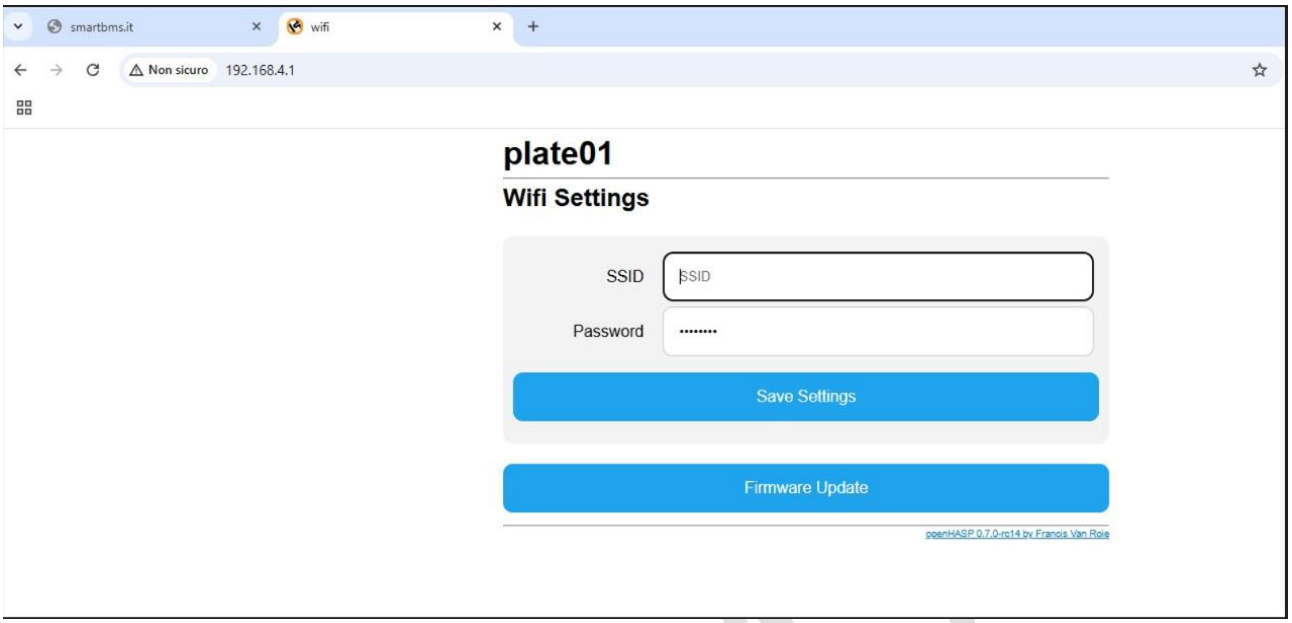
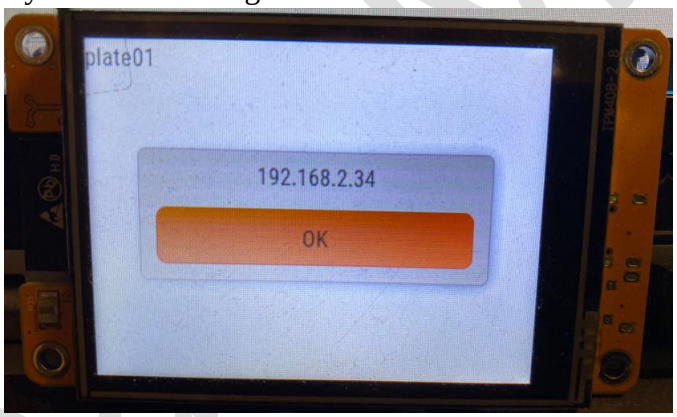


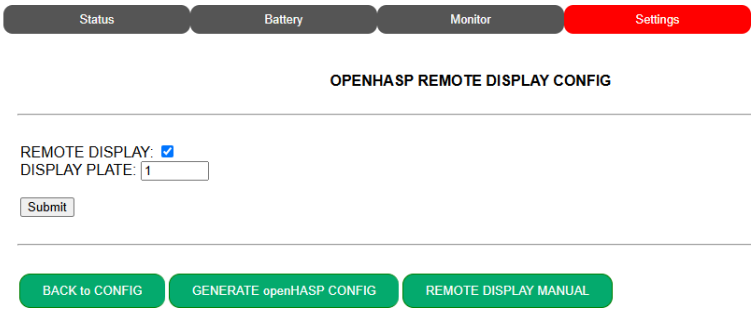
12- The Display RESTART – If you were not wrong entering Wi-Fi credentials, you will soon get a message on the display with the IP assigned. **TAKE NOTE OF IT!**



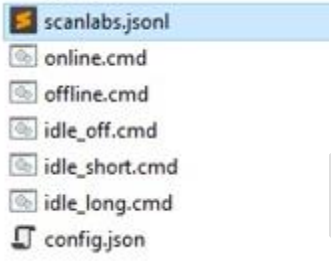
13- With your Internet Browser go to the IP address shown on the display. In this case 192.168.2.34



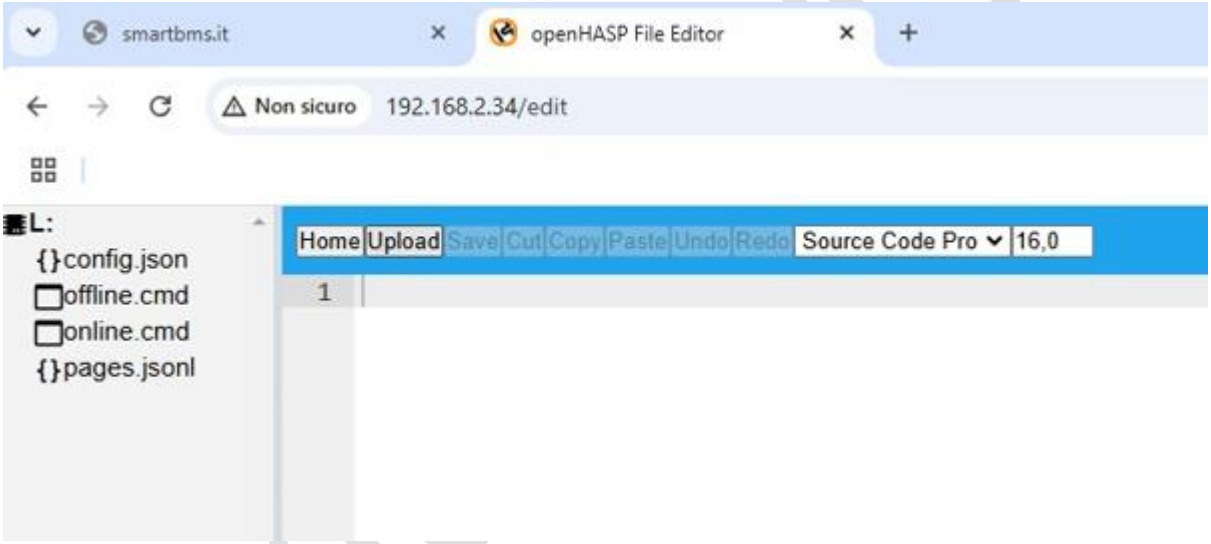
14- On the ScanLabs Dongle for BMS web Page "SETTINGS" -> "DISPLAY" enable "REMOTE DISPLAY" and select the Display PLATE id -> **SUBMIT** to enable the service
NOTE: If you have more than one dongle, each of them need a dedicated PLATE ID.



15- Press on “GENERATE openHASP CONFIG”. 7 files will be generated with you current setup:



16- GO to “FILE EDITOR” the second last one on the list of the openHASP display



17- Select “UPLOAD” and upload all the 7 files generated by the dongle. When all the 7 files are uploaded -> unplug USB, wait 5s and plug it again.

18- Et voila’ !

NOTIFICATION SERVICES TO MOBILE / PC / INSTAGRAM

PUSHSAFER and PUSHOVER

PUSHSAFER and *PUSHOVER* are third party services meant to receive push notification on mobile phones and/or computers generated by devices.

From fw release 2.1.1, ScanLabs WiFi Dongle is enhanced with this new service aim to send push notifications in one or more of the following conditions:

- Daily Report Sent when SunSet comes
- Daily Report Sent when SunRise comes
- Report when battery reaches 100% SOC
- Report when one or more Alarms is/are detected

Pushsafer it comes with a very interesting offer, as of today 0.99€ for 1000 notifications or 1.99€ for 2200 notifications ! looks nice don't you ?

For the sake of testing , *Pushsafer* offers 50 notifications for free, it's just a matter to create an account - install *Pushasafer* app on your mobile(s) and or PC(s) - setup the ScanLabs dongle accordingly and you are done.

Pushover offers as well free notifications for 30days after the activation and a 1 time cost of $4.99 for up to 10K notifications/month.

FIRST STEP for you is to choose which service you want to use between Pushsafer and PushOver. Up to You

Let's follow these steps to enable and test the *Pushsafer* and *PushOver* services

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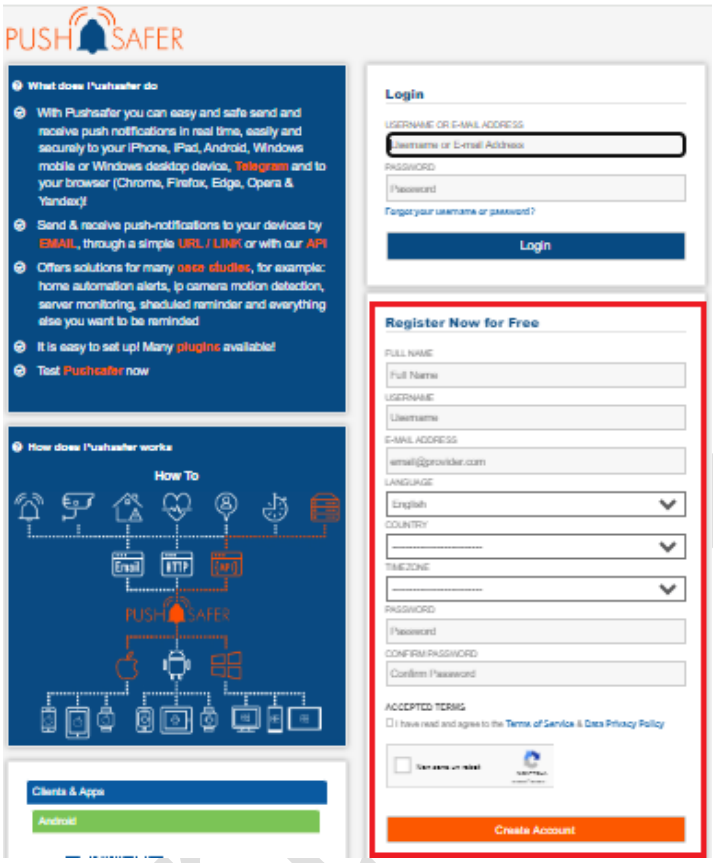
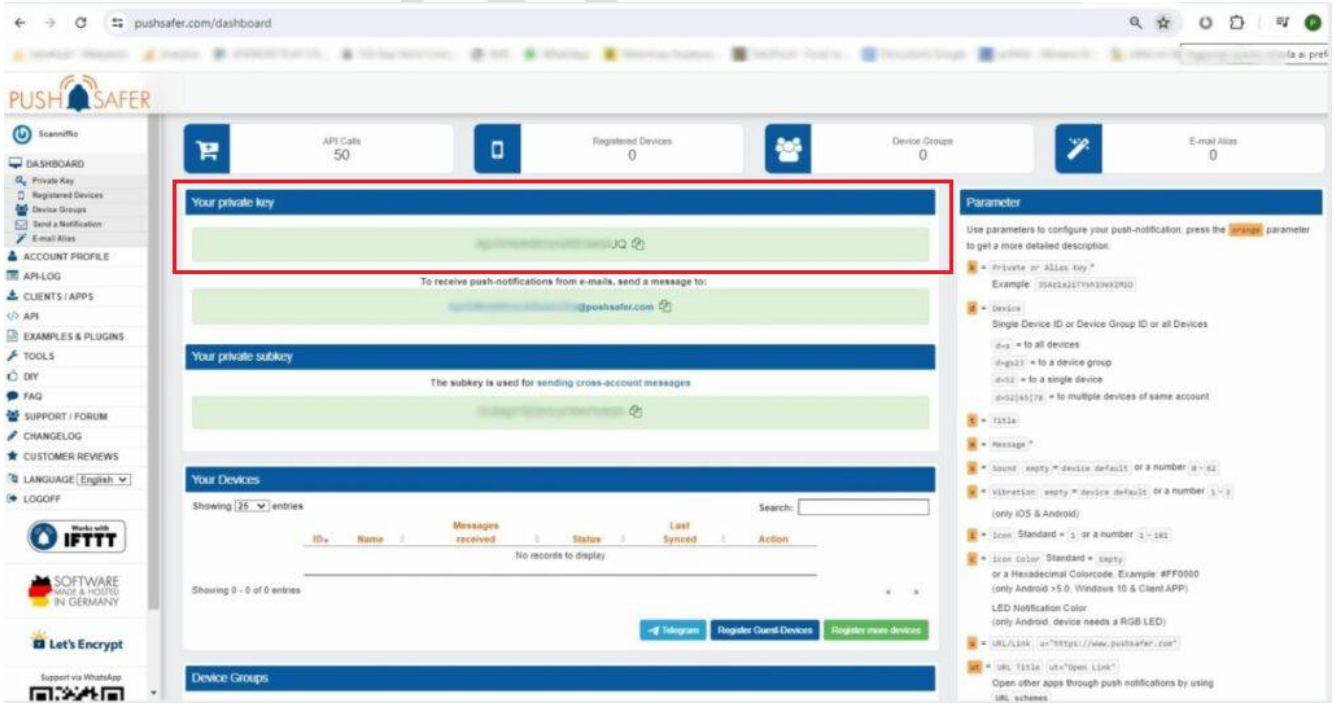
CONFIGURE PUSHSAFER

Create your free account on *pushsafer.com* you will have 50 free push to test the service

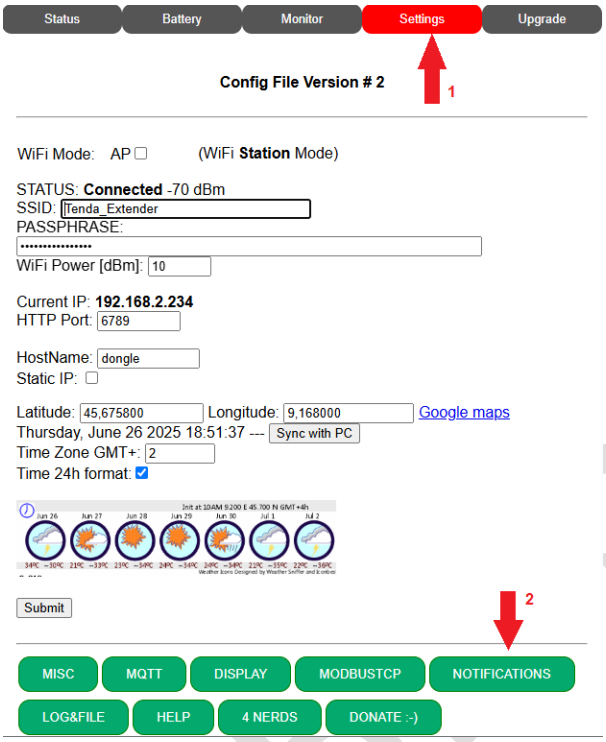


Login, on the main dashboard, copy "YOUR PRIVATE KEY"



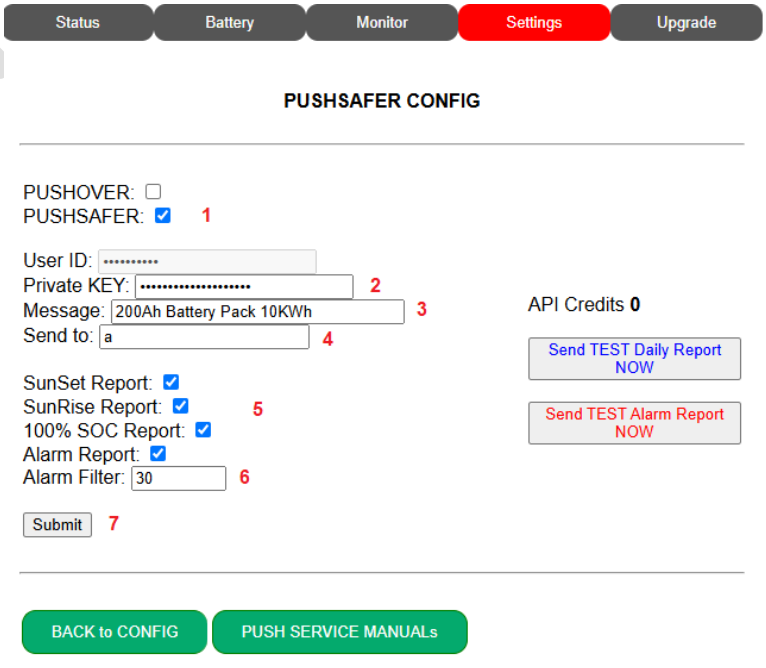
Go to your ScanLabs SmartBMS WiFi Dongle "Settings" web page

Select NOTIFICATIONS Service

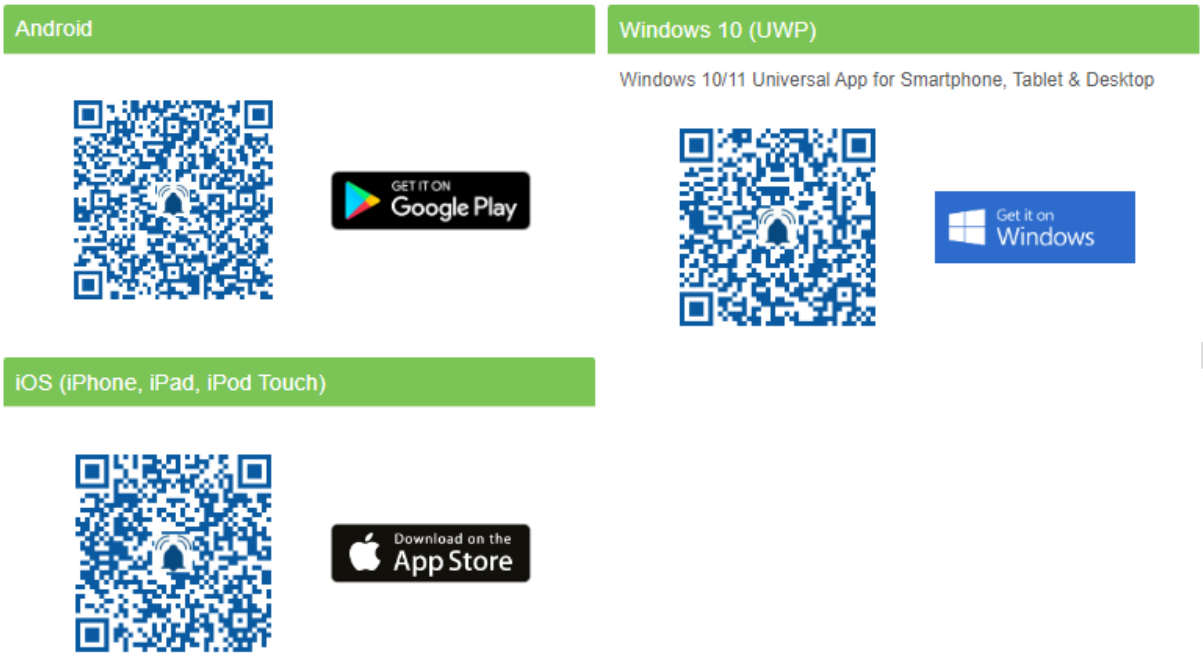


Setup the dongle with *Pushsafer* credentials (follow steps 1-5 on the image)

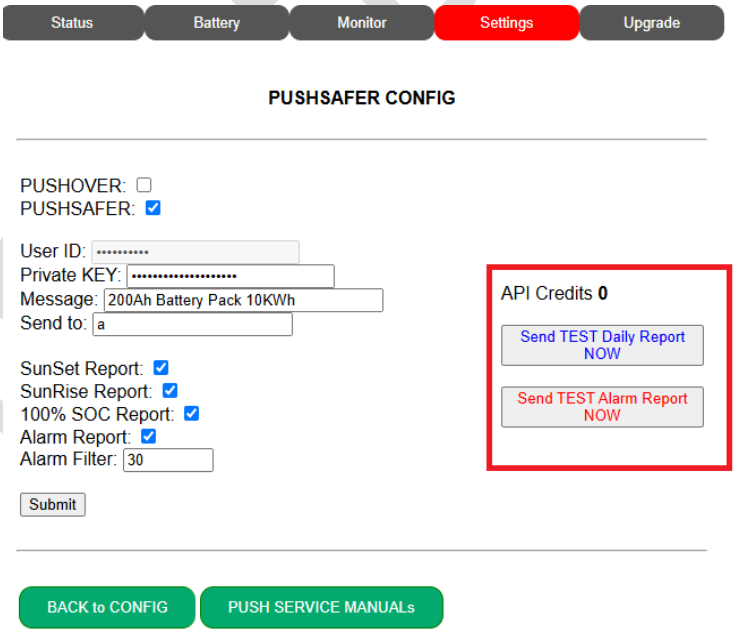
7- Enable PUSHSAFER
8- Paste your *PushSafer* "PRIVATE KEY"
9- Setup your friendly message each push will report
10- Select the group of receivers. “a” for all my devices
11- Select which kind of push you want to get every day
12- Enable Time filter to avoid multiple notifications are set. The same notification will not sent within the windows in minutes defined.
13- SUBMIT the settings



Using the QRCODE and Links offered on the main page of *PushSafer.com*, install the app on one or more iOS, Android, Windows , Telegram etc ....
login on each instance with the *PushSafer* credentials you have created

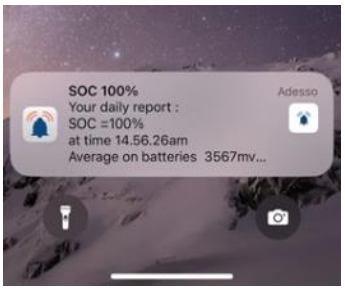


You are now ready to TEST if a push Notification reaches your device/s



NOTE: After the first Push sent, API Credits should update with the number of Push left

AT THIS POINT YOU SHOUL BE HAPPY ;-)







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CONFIGURE PUSHOVER

TBD

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