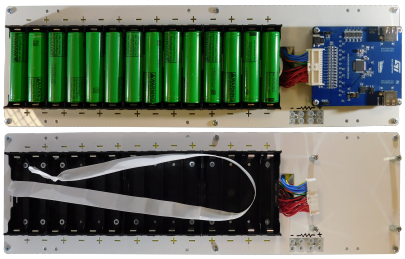
AEK-POW-BMSHOLD

Data brief

Battery holder for cylindrical batteries and battery management system node for automotive applications



Product summary	
Battery holder for cylindrical batteries and battery management system node for automotive applications	AEK-POW-BMSHOLD
Automotive chip for battery management applications with daisy chain up to 31 devices	L9963E
Battery management system module based on L9963E	AEK-POW-BMS63EN
SPI to isolated SPI dongle based on the L9963T transceiver	AEK-COM-ISOSPI1
Automotive general purpose SPI to isolated SPI transceiver	L9963T
AutoDevKit Studio for 32-bit power architecture MCUs	STSW-AUTODEVKIT
Application	Automotive Battery Management System (BMS)

Features

- 14-slot battery holder for cylindrical INR 18650 battery cells (not included)
- All batteries are connected in series
- Proper housing for the AEK-POW-BMS63EN BMS node (not included)
- Easy battery removal supported by a satin ribbon
- Low-side current sensing through an external resistor included in the package a 100 mΩ, 10 W resistor
- Five NTC thermistors (included)
- Stackable kit to build a compact battery pack (mechanical parts included)
- Dimensions 425 x 120 x 52 mm
- Included in the AutoDevKit ecosystem

Description

The battery management system (BMS) is a fast-growing application pervading several fields of the electronic industry including automotive and industrial markets.

To support fast evaluation and meet stringent time-to-market for BMS solutions, the AutoDevKit ecosystem has been extended to include a specific cylindrical battery holder.

The purpose of this extension is to quickly create a battery pack to evaluate ST BMS solution based on the AEK-POW-BMS63EN analog front-end node hosting the L9963E and the AEK-COM-ISOSPI1 ISOSPI transceiver hosting the L9963T.

The AEK-POW-BMSHOLD battery holder contains a maximum of 14 cells, all connected in series, and a dedicated slot and connector for the AEK-POW-BMS63EN board.

To build a complete battery pack in both centralized or dual-ring topologies, you can stack up to three / four AEK-POW-BSMHOLD kits (the limit is the stackable weight). A separate bag inside the kit package contains six M3x12 mm pan steel screws, four M3x25 mm plus six M3x30 mm hexagonal steel spacers. These elements can be used to mount another AEK-POW-BMSHOLD layer.

The AEK-POW-BMSHOLD has a long satin ribbon tied to a buttonhole on the plexiglass used to support easy battery removal.

The internal wiring of the featured 4-pole mammoth connector allows adding a sensing resistor between pin 2 and pin 3. Pin 1 and pin 4 are, respectively, the positive and the negative terminals of the mockup. For demo purposes, a 100 mΩ, 10 W, ±1% precision resistor is included in the kit package.

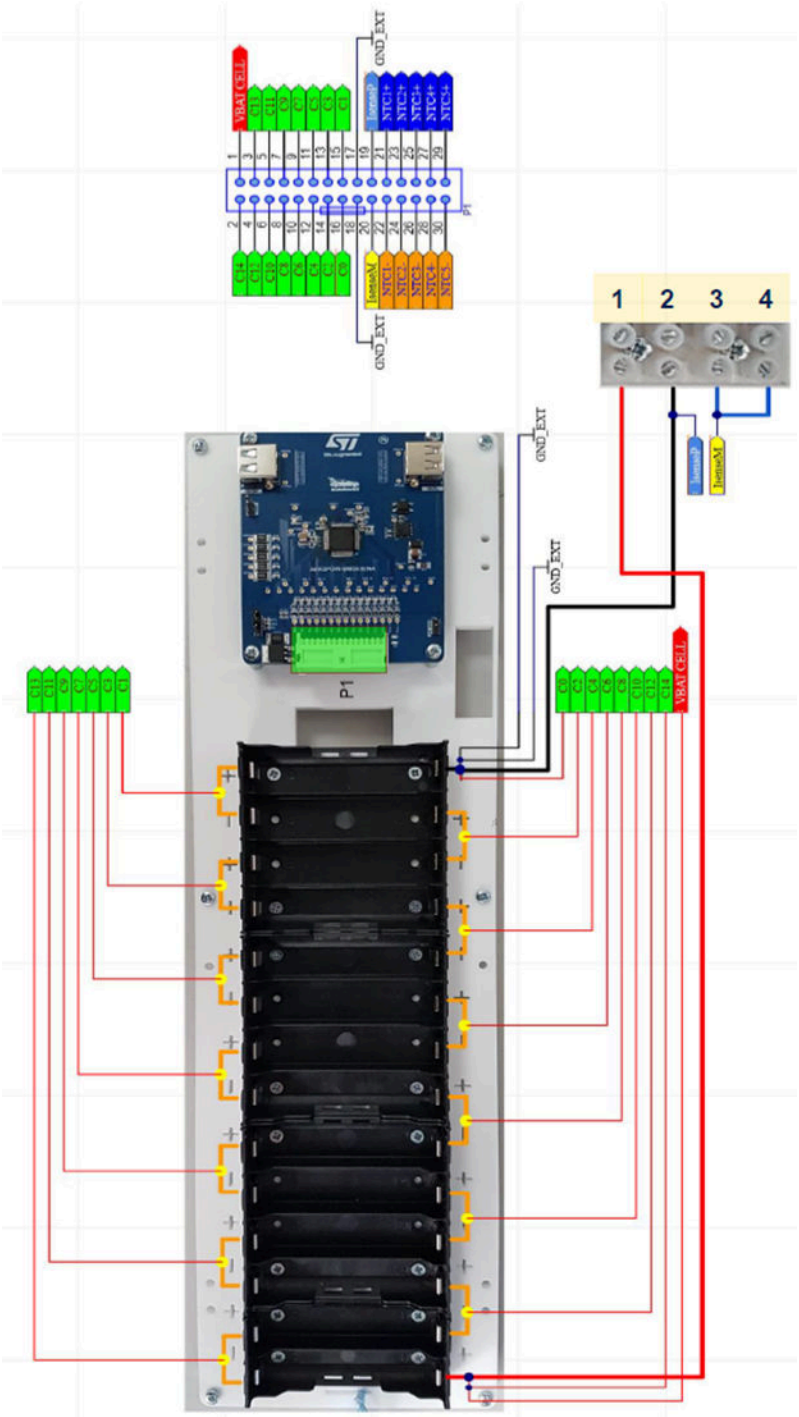
The AEK-POW-BMS63EN node board has to be connected to the crimped central connector provided in the AEK-POW-BMSHOLD kit. The connector is organized as follows:

- Pin 1 is the cell VBAT
- Pin 2 to 16 are dedicated to the battery connections
- Pins 17 and 18 are ext Ground
- Pins 19 and 20 are ISenseP and ISenseM
- Pins 21 to 30 are dedicated to NTCs for temperature sensing. The even numbers with yellow cables are NTC-, whereas the odd numbers with blue cables are NTC+. Five 10 kΩ, ±1% tolerance NTC thermistors are provided in the kit.

The AEK-POW-BMSHOLD kit supports INR 18650 battery type. The estimation of SoC and SoH included in AutoDevKit Studio is computed through an extended kalman filter with characterization data coming from INR 18650 MJ1 batteries by LG.

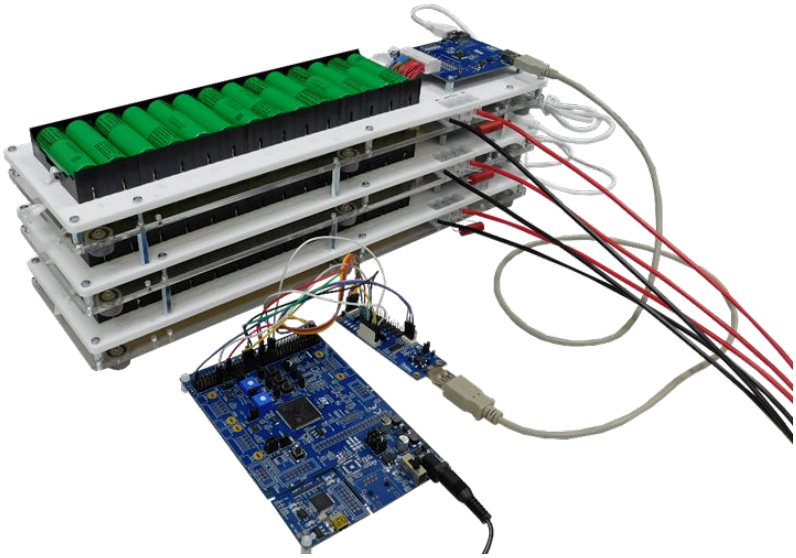
1 Block diagram

Figure 1. **Block diagram**



Stacked layers are controlled by a master AEK-MCU-C4MLIT1 with SPC58EC Chorus 4M main automotive-grade connected through the AEK-COM-ISPOSPI1 board to the first node.

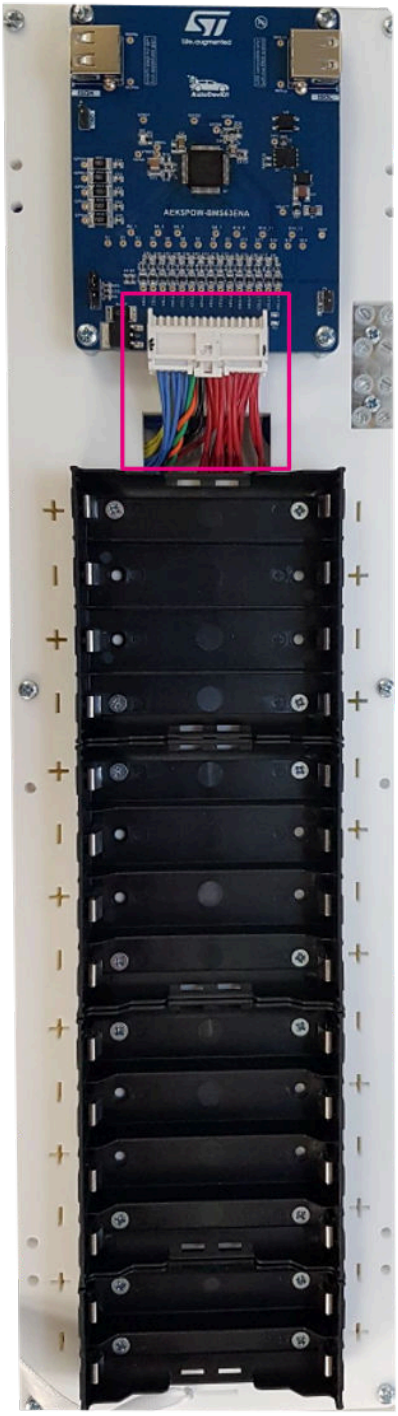
Figure 2. **Stacked layers**



2 How to use the AEK-POW-BMSHOLD

Step 1. Connect the AEK-POW-BMS63EN to the battery holder through the dedicated connector.

Figure 3. AEK-POW-BMS63EN connection to the battery holder



Step 2. Use the screws included in the pack to anchor the board to the mockup.

Step 3. Place the batteries in the dedicated slot.

Note: The cell number goes from 1 to 14 (from the board downwards to the end of the mockup).

Important:

Pay attention to the polarity indicated on the plexiglass to avoid short-circuits.
Place the satin ribbon under the batteries to remove them easily.

Step 4. Optionally, you can use the flying cables to connect the NTCs included in the pack.

After connecting one or more NTCs to the positive and negative cables, you can place them on the batteries to sense the cell temperatures.
Cell voltage varies according to the external temperature variations. Voltages are indicated in the characterization curve of the component datasheet (Vishay, PN NTCALUG02A103F).

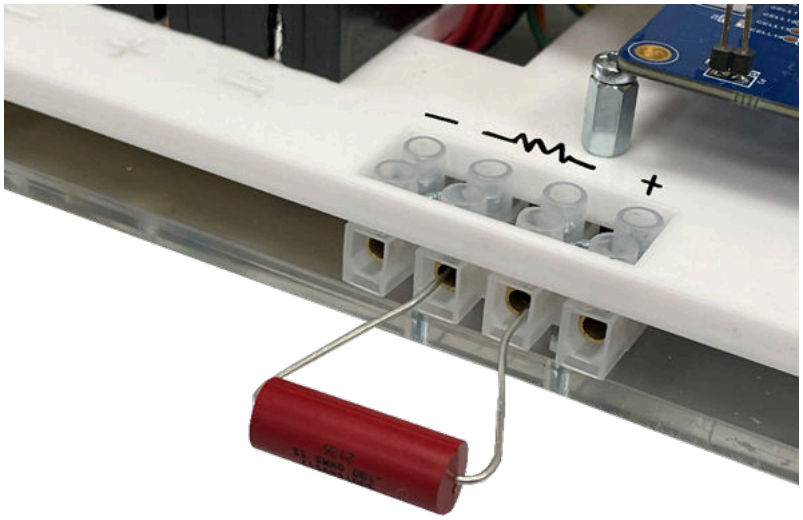
Figure 4. Cables to connect external NTCs

Step 5. The battery holder could also be used to supply an external load, such as a motor, a lamp, LEDs, etc. For this scope, connect the resistor (included in the pack) to the mammoth connector. Then, connect the positive and negative cables to the load as indicated on the plexiglass.

Figure 5. Connection scheme

The maximum current allowed is 10 A. You could connect another resistor to absorb more current.

Figure 6. **Connecting the resistor to the mammoth connector**



Revision history

Table 1. **Document revision history**

Date	Revision	Changes
11-Sep-2023	1	Initial release.