BLE ADV Protokoll

LIONTRON BATTERIE INTEGRATION

Documentation
for the integration of battery information via the BLE ADV protocol

Introduction

This documentation describes the structure of the BLE ADV Manufacturer Data for Liontron batteries with the CompanyID 0x0211.

The goal is to provide developers with an overview of how to extract and interpret the battery parameters from the BLE ADV header. Key parameters such as voltage, state of charge (SOC), current, and capacity are covered.

The protocol enables efficient transmission of battery status data over BLE.

The BLE ADV header for Liontron batteries consists of a series of bytes that encode various information, such as voltage, current, remaining capacity, and state of charge.

The data structure is as follows:

Byte	Bit-Description	Parameter
2-3	PPPPPPPP (Unused)	-
4-5	LLLLLLLL LLLLLLLL	Lock
6-7	VVVVVVVV VVVVVXFF	Voltage
8-9	CCCCCCCC CCCCCCCC	Current
10-11	RRRRRRRR RRRRRRRR	Remaining Capacity
12-13	KKKKKKKK KKKKKKKK	Total Capacity
14-15	SSSSSSST TTTTTKKK	State of charge (SOC) and temperature
16-17	YYYYYYYY YYYYYIII	Cycles
18-26	Cell voltages	-
27	Softwareversion	-
28	Chip-Typ und ADV-Version	-

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Important parameters for monitoring the battery

1. Voltage

The voltage is stored using 13 bits in bytes 6 and 7. The maximum value is 81.92V and it is encoded in steps of 0.01V.

- **Bytes 6-7**: VVVVVVVV VVVVVXFF
- **Maximum voltage**: 81,92V (0x1FFF)

Calculation:

uint16_t v = buffer[6] << 8;

v |= buffer[7];

v = v >> 3; // Shift by 3 bits

float voltage = (float)v / 100.0; // Voltage in volt

2. Current

The current value is encoded using 16 bits in bytes 8 and 9. It has a range of ±327.67A or ±3276.7A, depending on the scaling.

- **Bytes 8-9**: CCCCCCCC CCCCCCCC
- **Maximum current**: ±327,67A (with scaling of 100)

Calculation:

int16_t a = buffer[8] << 8;

a |= buffer[9];

a = a - 32767; // Offset is substracted

float current = (float)a / 100.0; // Current in ampere

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3. State of Charge - SOC

The state of charge (SOC) is stored in 7 bits in byte 14. The maximum possible value is 127%, encoded as 0x7F.

- **Byte 14**: SSSSSSST
- **Maximum SOC**: 127%

Calculation:

uint8_t soc = (buffer[14] & 0b11111110) >> 1; // SOC read out and shift 1 bit

4. Capacity

The capacity is given in Ah and encoded over 16 bits in bytes 12 and 13.

- **Bytes 12-13**: KKKKKKKK KKKKKKKK
- **Maximum capacity**: 655,35 Ah

Calculation:

uint16_t capacity = buffer[12] << 8;

capacity |= buffer[13];

float totalCapacity = (float)capacity / 100.0; // Capacity in Ah

Example code for extracting the most important battery parameters

Here is a simple code example that shows how to extract voltage, current, state of charge (SOC), and capacity from the BLE ADV header.

Code example:

```
void parseBatteryData(uint8_t* buffer) {
  // Voltage
  uint16_t v = buffer[6] << 8;
  v |= buffer[7];
  v = v >> 3;  // Shift by 3 bits
  float voltage = (float)v / 100.0;  // Voltage in volts
  Serial.print("Spannung: ");
  Serial.println(voltage);
```

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```
  // Current
  int16_t a = buffer[8] << 8;
  a |= buffer[9];
  a = a - 32767;  // Offset is substracted
  float current = (float)a / 100.0;  // Current in ampere
  Serial.print("Current: ");
  Serial.println(current);

  // State of charge
  uint8_t soc = (buffer[14] & 0b11111110) >> 1;  // SOC read out and move 1 bit
  Serial.print(" State of charge: ");
  Serial.println(soc);

  // Total capacity
  uint16_t capacity = buffer[12] << 8;
  capacity |= buffer[13];

 float totalCapacity = (float)capacity / 100.0;  // Capacity in Ah
  Serial.print("Capacity: ");
  Serial.println(totalCapacity);
}
```

Summary

This documentation provides a detailed overview of the relevant parameters that can be extracted from the BLE ADV header to monitor the battery status. The information includes voltage, current, state of charge (SOC), and capacity. This protocol enables efficient and straightforward integration of battery data into BLE-enabled systems.

Please ensure that the implementing developers correctly apply the byte order and bit masking to accurately extract the battery data.

If further questions or clarifications are needed, we are happy to assist you.

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