

Bill of Materials

Modules	Label or Nickname	Product Name or Code	Detailed Description	Unit Cost	Quantity	Function	Socket
1	Arduino Beetle Board	DFRobot0282	ATmega32U4 Beetle AVR® ATmega AVR MCU 8-Bit Embedded Evaluation Board	R 194.64	4	BMS monitoring module MCU.	J1, J2, J3, J4 1x7pin, 1x5pin, 1x5pin, 1x7pin
2	MINIBOOST 5V	AP3602A	Adafruit Industries LLC - DC/DC, Step Up 1, Non-Isolated Outputs Evaluation Board.	R 50.46	4	5V system supply.	J8, 1x4pin
3	16-bit ADC	ADS1110 Module	ADS1110 High Precision A/D Converter, 16-Bit, I2C, Low Power	R 88.00	4	High resolution cell voltage measurement.	J27, 1x6pin
4	External Temp sensor	18B20 Temperature Module	Electronic thermometer which has high accuracy over a wide range (accurate to $\pm 0.5^{\circ}$ Cover the range of -10°C to $+85^{\circ}\text{C}$).	R22.00	4	Cell temperature measurement	J16, 1x3pin

PCB components	Tag	Product Name or Code	Detailed Description	Unit Cost	Qty	Function	KiCad			
							Ref	Qty	Val	Dscrp
1	0.1µF Capacitor	C1608X7R1E104K080A A	0.1 µF ±10% 25V Ceramic Capacitor X7R 0603 (1608 Metric)	R0,51	8	Filter comms isolated supplies.	C1, C2	2	0.1µF	Unpolarized capacitor
2	Red LED	LTST-C150KRKT	Red 631nm LED Indication - Discrete 2V 1206 (3216 Metric)	R3,45	5	System debug indicator.	D1	1	20mA 2V LED	Light emitting diode
3	Green LED	LTST-C150KGKT	Green 470nm LED Indication - Discrete 3.3V 1206 (3216 Metric)	R3,45	4	Indicate module power on.	D2	1	20mA 2V LED	Light emitting diode
4	Blue LED	LTST-C150TBKT	Blue 470nm LED Indication - Discrete 3.3V 1206 (3216 Metric)	R3,45	4	Indicate when dumpload is active.	D3	1	20mA 2.8V LED	Light emitting diode
5	Fuse	021701.6TXP	FUSE GLASS 1.6A 250VAC 5X20MM	R6,49	4	Overcurrent protection.	F1	1	Fuse 1.6A.	Glass fuse
6	NMOS	IRF540NLPBF	N-Channel 100 V 33A (Tc) 130W (Tc) Through Hole TO-262	R20,35	8	High-side switch.	Q1, Q2	2	IRF540 N	33A Id, 100V Vds, HEXFET N-Channel MOSFET
7	Comms isoChip	ISO7421D	General Purpose Digital Isolator 2500Vrms 2 Channel 1Mbps 25kV/µs CMTI 8-SOIC (0.154", 3.90mm Width)	R54,34	4	Isolates module different voltage levels on comms line.	U1	1	ISO742 1	25kV isolating voltage coupler
8	2channel ANDgate	SN74LVC2G08DCTR	Texas Instruments SN74LVC2G08DCTR, Dual 2-Input AND Logic Gate, 8-Pin SSOP	R13,94	4	Communication logic hardware.	U2	1	SN74LV C2G08D CTR	Dual channel and gate.
9	LM4040AIM5 Vref IC	Texas Instruments Fixed Shunt Voltage Reference 5V ±0.1 % 3-Pin SOT-23, LM4040AIM3-5.0/NOPB	Precision Fixed and Adjustable Voltage Reference ICs utilising series, shunt or series/shunt topologies and available in both through-hole and surface mount packages. Voltage References are available with initial accuracies of ±0.02 to ±2%.	R58,64	4	Provide high precision reference voltage for ADC module.	U3	1	LM4040 DBZ	5.000V Precision Micropower Shunt Voltage Reference

10	Thermistor	TE Connectivity Thermistor, 10kΩ Resistance, NTC Type, 0805 (2012M), 2 x 1.25 x 0.5mm	NTC chip thermistors offering a high thermal sensitivity. Suitable for temperature compensating circuits and other applications requiring a resistance that varies according to the ambient temperature	R23,79	4	Used to measure the module's internal temperature.	TH1	1	Thermistor_NTC	Temperature dependent resistor, negative temperature coefficient
11	150Ω Resistor	CRGP1206F150R	150 Ohms ±1% 0.5W, 1/2W Chip Resistor 1206 (3216 Metric) Pulse Withstanding Thick Film	R4,99	8	Limit current to LED.	R1, R5	2	150Ω	Chip resistor
12	10kΩ Resistor	RNCP1206FTD10K0	10 kOhms ±1% 0.5W, 1/2W Chip Resistor 1206 (3216 Metric) Anti-Sulfur Thin Film	R1,56	16	Pull up, pull down resistors.	R2, R4, R7, R13	4	10kΩ	Chip resistor
13	499Ω Resistor	ERA8AEB4990V	Panasonic 499Ω, 1206 (3216M) Thin Film SMD Resistor ±0.1% 0.25W	R9,18	8	Limit mosfet's gate current.	R3, R6	2	499Ω	Chip resistor
14	20Ω Resistor	CRCW120620R0FKEAH P	Vishay 20Ω, 1206 (3216M) Thick Film SMD Resistor ±1% 0.5W	R5,12	4	Limit current to LED.	R8	1	20Ω	Chip resistor
15	13Ω Resistor	HRG3216Q-13R0-D-T1	13 Ohms ±0.5% 1W Chip Resistor 1206 (3216 Metric) Anti-Sulfur, Automotive AEC-Q200, Moisture Resistant Thin Film	R9,74	16	Dumpload resistors.	R9, R10, R11, R12	4	13Ω	Chip resistor
16	1kΩ Resistor	CRCW12061K00FKEA	Vishay 1kΩ, 1206 (3216M) Thick Film SMD Resistor ±1% 0.25W	R1,52	4	Something to do with Vref.	R14	1	1kΩ	Chip resistor
17	2.2kΩ Resistor	ERA8AEB222V	Panasonic 2.2kΩ, 1206 (3216M) Metal Film SMD Resistor ±0.1% 0.25W	R8,36	8	ADC pull-up resistors.	R15, R16	2	2.2kΩ	Chip resistor
18	1μF Capacitor	C1608X7R1E105K080A B	1 μF ±10% 25V Ceramic Capacitor X7R 0603 (1608 Metric)	R1,41	4	ADC supply filter.	C3	1	1μF	Filter capacitor
19	Terminal connectors	360272	Terminal Block MetzConnect 360272 1x1 Screw M2.6	R8,88	8	Connects module to cell terminals.	J5, J6	2	Screw Terminal 1x1	Generic screw terminal, single row
20	Current sensor.	Allegro Microsystems ACS770LCB-100U-PFF-T, Current Sensor IC 5-Pin, PFF	Allegro Current sensor IC, conductor resistance of 100 μΩ typical for ultra-low power loss, Hall Effect Current Sensor.	R157.61	1	Measures the battery current at master controller.	-	-	-	-