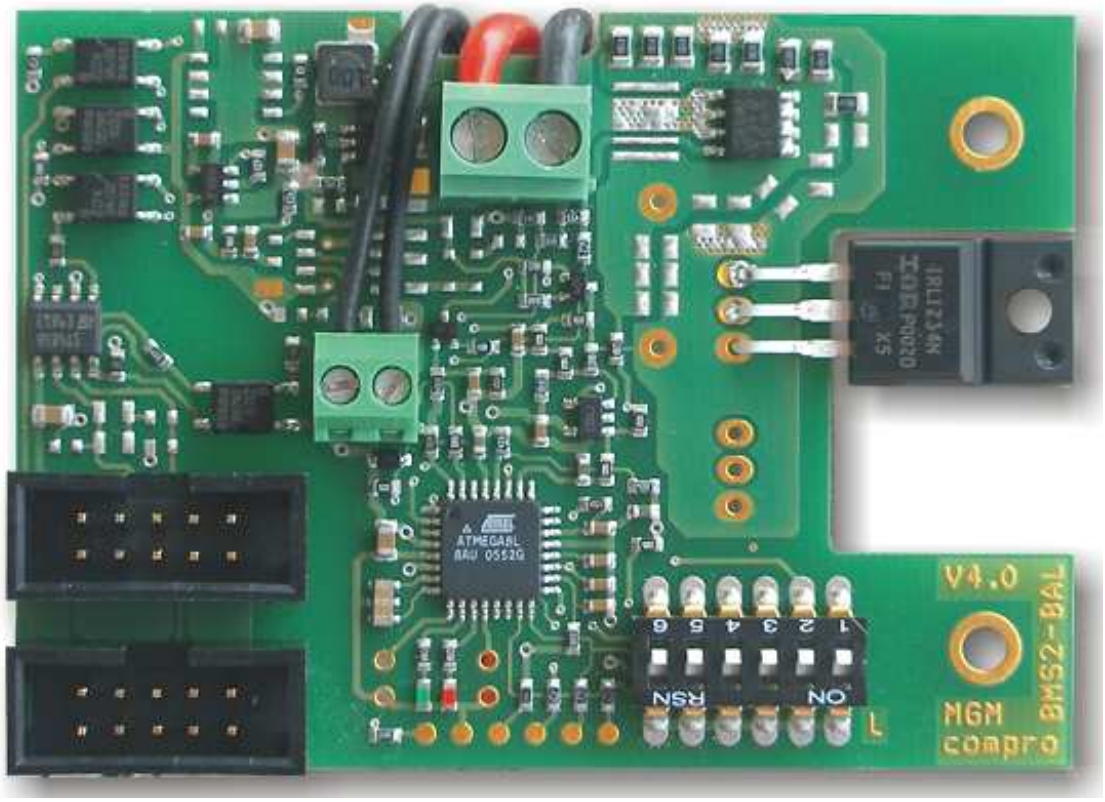
GWL/ Power Group Technology Solutions - Stay Powered for the Future

Real Time Battery Management System (RT-BMS)

Product Specification



CBU modules version 4.0

September 2011

---

http://www.ev-power.eu

EV-Power.eu managed by **i4wifi a.s.** (member of GWL/Power group)
Prumyslova 11, CZ-10219 Prague 10, CZECH REPUBLIC (EU)
phone: +420 277 007 500, fax: +420 277 007 529, email: export@i4wifi.cz

CBU Modules specification – general information

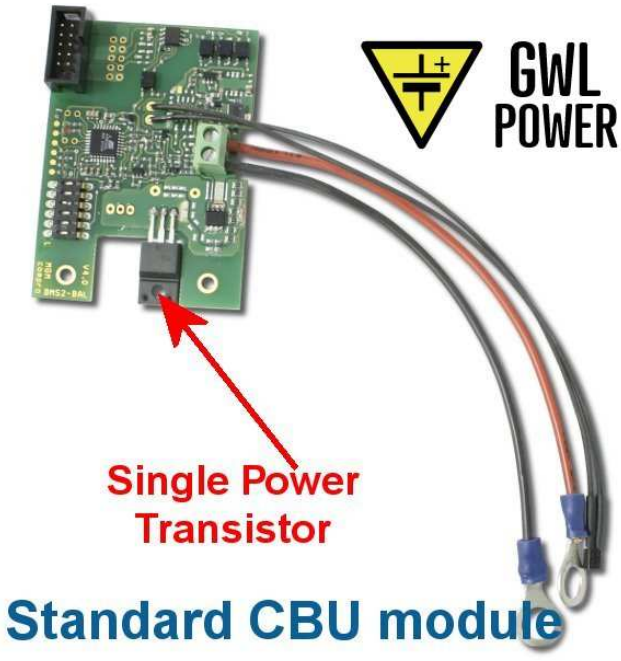
The Cell Balancing Unit (CBU) modules are used to measure the voltage and the temperature of individual cells of the battery pack. The modules also provide the balancing function during battery charge process. The balancing process is allowing to release some part of the charging power through the high-power MOSFET transistor. During the discharge phase, the cell voltage and temperature is also measured. It is necessary to install one module for each battery cell. Maximal number of CBU modules in one system is 192.

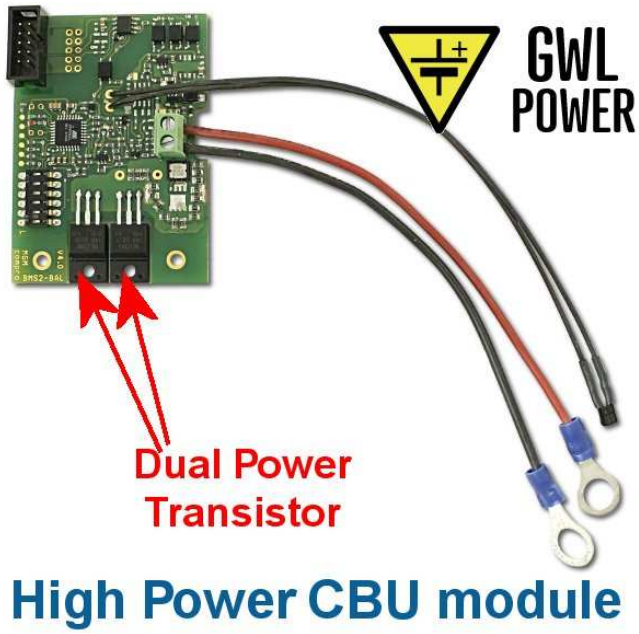
You can use the CBU with lead acid (Pb) cells, Lipoly (like A123), LiPol, LiFe and many other types of other lithium based cells cells, i.e. all types of the rechargeable cells with operating voltage in the range 1,8 – 5 Volts.

The CBU modules in all versions (Standard power 5A version, High power 10A version) have a unique method of measuring the temperature of the power MOSFET element. This allows to reach the maximal energy dissipation while protecting the MOSFET element against over heating and internal damage.

In order to provide compliance with EC safety regulations, there is a significantly increased isolation voltage level between communication line (to the RT-BMS Master driving unit) and each battery cell (and the connected CBU units) – up to 3 kV.

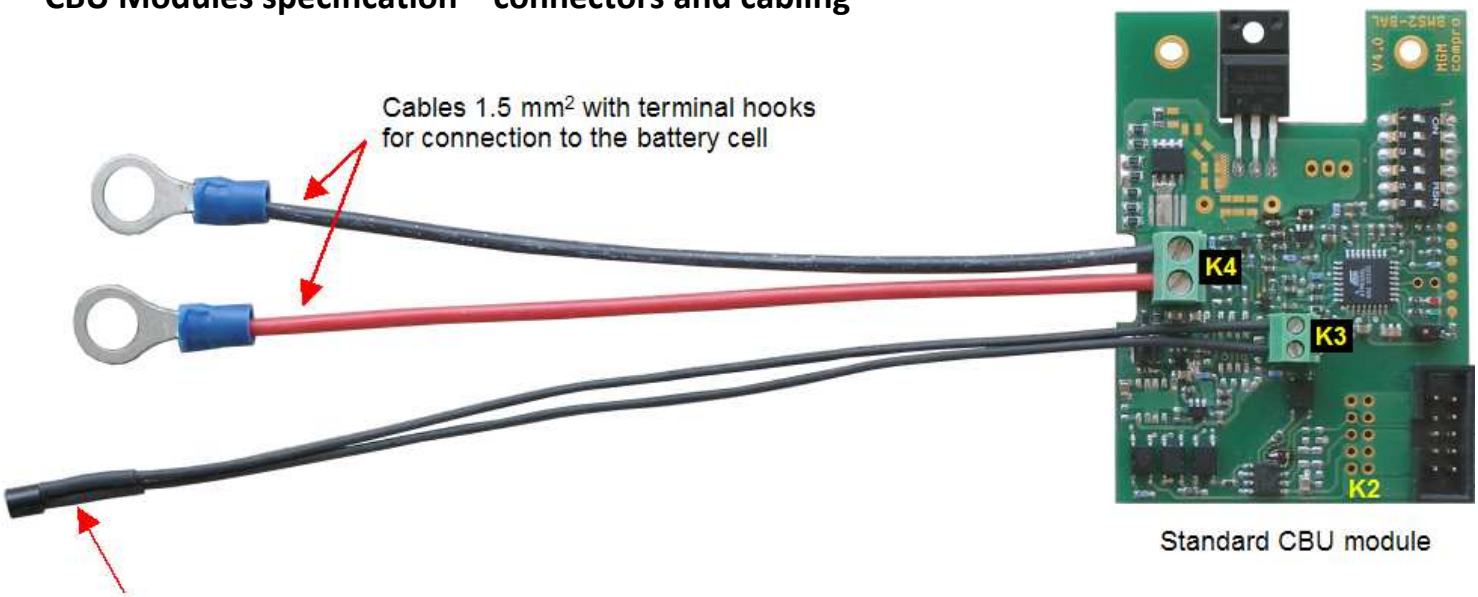
The CBU modules have three functional modifications:
1) The standard type with one data-line connector.
2) The standard type with additional connector - marked ACC on the board. The additional connector allows to separate the data-line and makes it possible to disconnect parts of the battery pack.
3) The terminal type (with termination impedance resistors on the data-line) - marked ZR on the board.
(Note: the very last module on the 10 pin dataline bus must be the "ZR" type - with the terminating impedance. The terminal ZR modules are supplied with the RT-BMS Master units. The 64 cell version with one data-line is supplied with one ZR module. The 192 cell version with 3 datalines is supplied with three ZR modules)





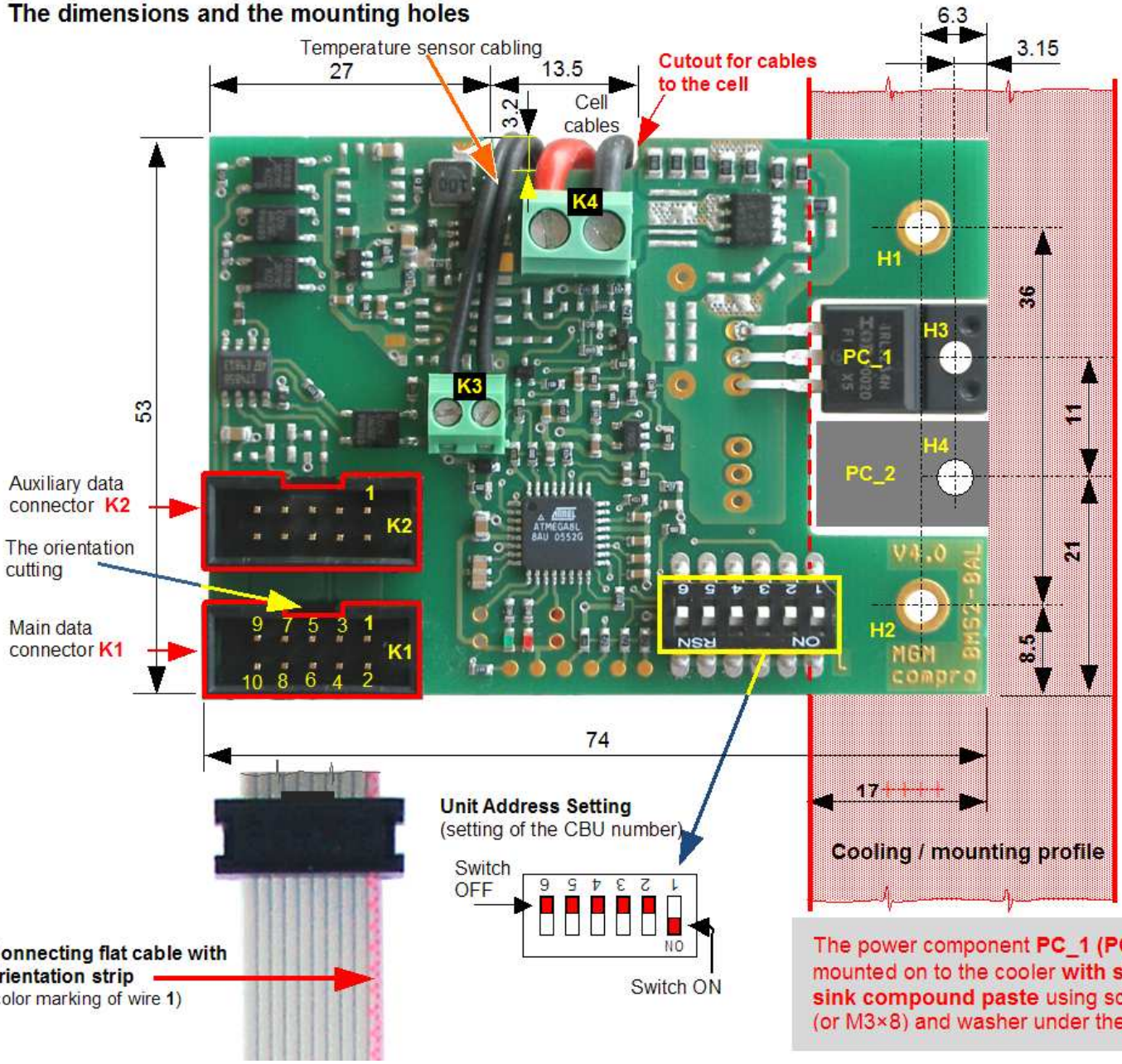
Dimension of the CBU	74 × 53 mm
Weight of each module	approx 50 grams (without cabling)
Mounting to cooler	screws M3
CBU module current consumption in sleep mode	approx 100 µA
CBU module current consumption in operating mode	approx 30 mA
Isolation voltage (the data-line to the cell (electronics)	> 3kV
Operating voltage of the measured cell	min 1.8V. max 5.0 V
The balancing current per cell	0 up to 5 A – standard CBU module 0 up to 10 A – high power CBU module

CBU Modules specification – connectors and cabling



Standard CBU module

The dimensions and the mounting holes



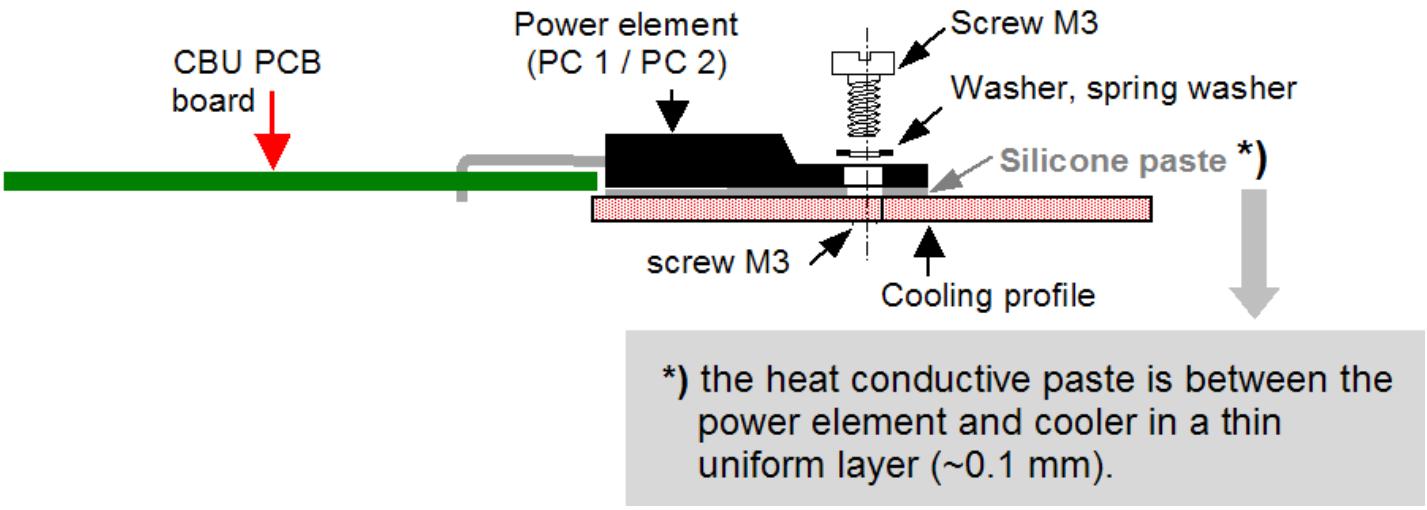
The power component **PC_1 (PC_2)** is mounted on to the cooler **with silicone heat sink compound paste** using screw M3×6 (or M3×8) and washer under the screw head.

Connectors of the CBU:

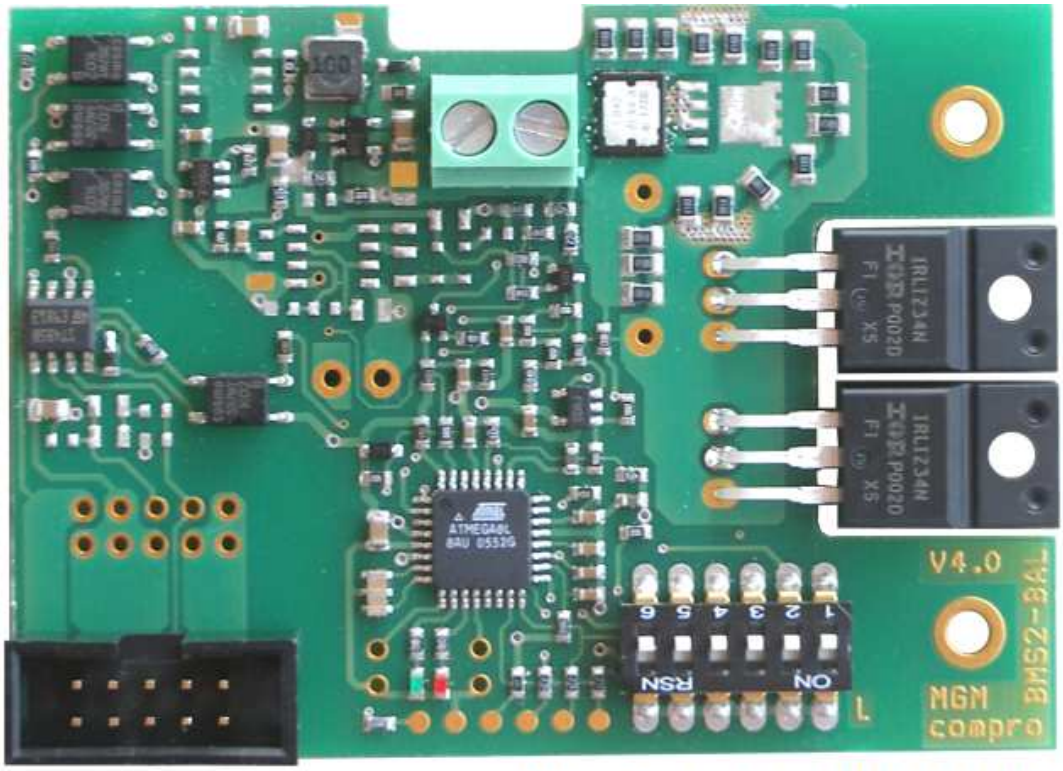
K1 – the data line – to connect the 10 pin flat cable
K2 – the data line – the auxiliary connector – allows to split the data-line – available in the ACC version of the CBU
K3 – the temperature sensor – **optional connector** – by standard the temperature sensor is soldered directly to CBU
K4 – the cell connection – to connect the CBU to the cell.

Note: Please **observe the polarity** when connecting the battery! Reversed polarity will burn the CBU module. Plus pole is marked by the read color – towards the temperature sensor. The minus pole is towards the high-power MOSFET. Please **observe the maximal voltage**. The maximal voltage is 5 Volts. Mistaken connection to higher voltage will damage the CBU module.

The cooling of the CBU power element

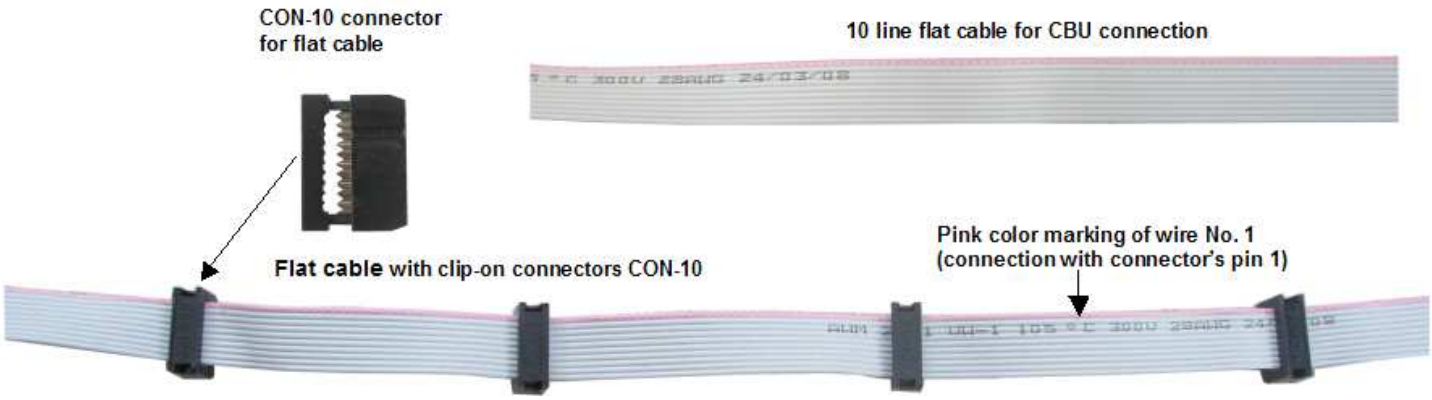


The proper cooling of the CBU modules is important for the correct and effective operation of the balancing function. If the cooling (heat dissipation) is not sufficient, the power element is over heated and the CBU cannot continue balancing. The RED LED light on each CBU module signals such over heating condition. You can do following to improve the situation: 1) increase the size of the cooler or add additional ventilator to improve the air flow; 2) decrease the charging current for the battery to allow CBU to balance properly; 3) increase the nominal voltage to shorten the balancing period (e.g. from 3.60V to 3.75V). Note: you should never use the cells as a cooling substance – the heat dissipation into the cells will warm the cells irregularly and the performance of the cells may be influenced.

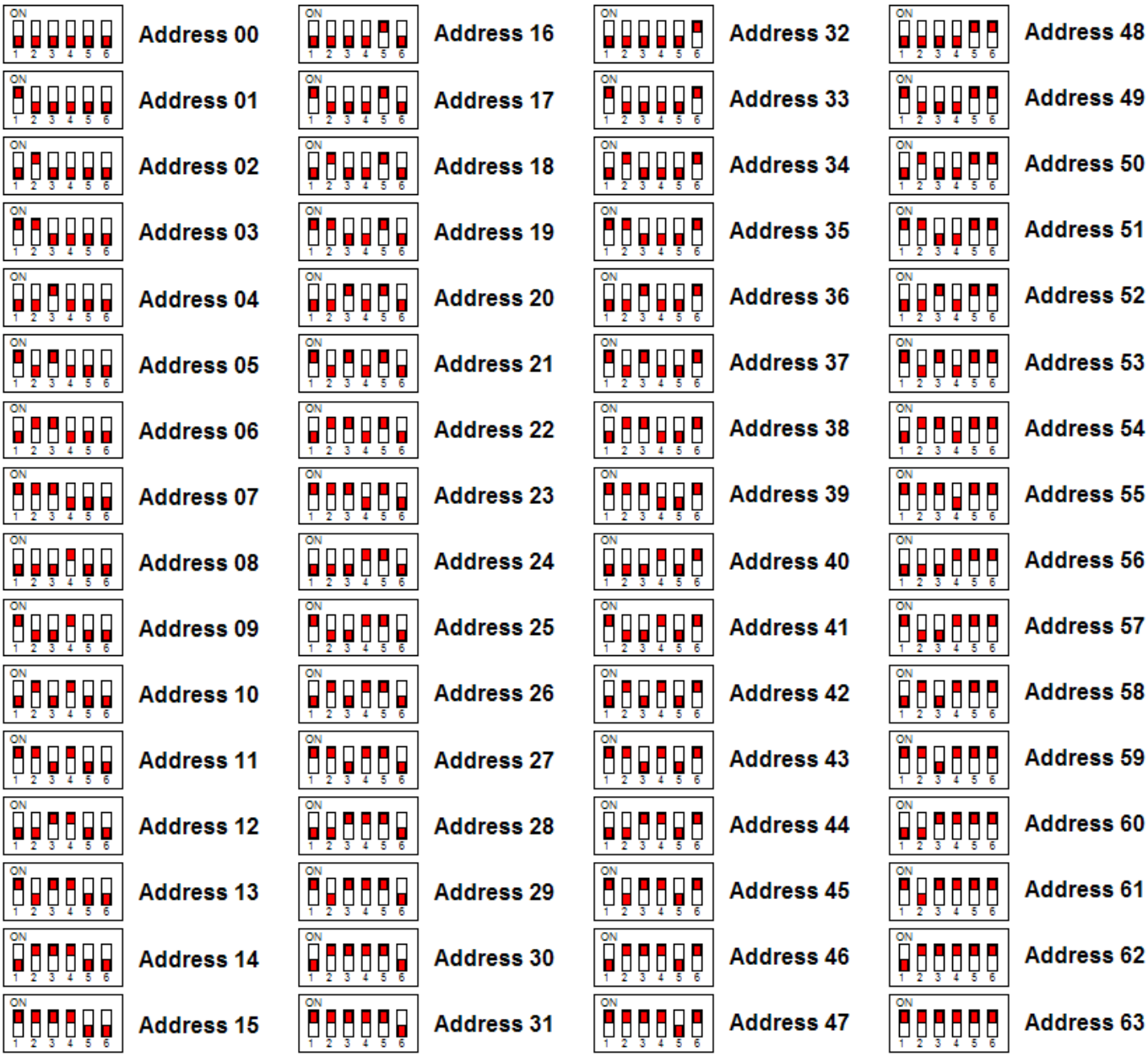


High power CBU module

The 10 pin data line flat cable and the connector for flat cable



The CBU module addressing table



The Product Additional Information

Recycling

This symbol on the product and / or accompanying documents mean that used electrical and electronic products should not be mixed with general household waste.

For proper treatment, recovery and recycling, please take these products to designated collection points, where they will be accepted on a free of charge basis.

Electromagnetic Conformity declaration

CE For all products of the BMS family we confirm that the electromagnetic compatibility directives are met.

---

http://www.ev-power.eu

EV-Power.eu managed by **i4wifi a.s.** (member of GWL/Power group)
Prumyslova 11, CZ-10219 Prague 10, CZECH REPUBLIC (EU)
phone: +420 277 007 500, fax: +420 277 007 529, email: export@i4wifi.cz