

## **en/Single-BL-Ctrl\_3**

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# 1 Single BL-Ctrl V3.0 2XL

## 1.1 power

- voltage : 10 to 30V -> 3 -7S Lipo
- 6 -layer PCB for optimal heat dissipation . 70u copper layers make the entire circuit board to the heat sink .
- current: up to 60A (Peak per BL-Unit)
- current limiting and temperature limiting
- Active freewheeling -> less power loss


## 1.2 Fast response with speed control

- rapid acceleration and braking of the propeller. Active and seamless braking gives the speed precisely and quickly on the new setpoint .
- return energy to the lipo when braking. Seamless transition from acceleration to braking
- significantly faster control with speed control

## 1.3 Other Features

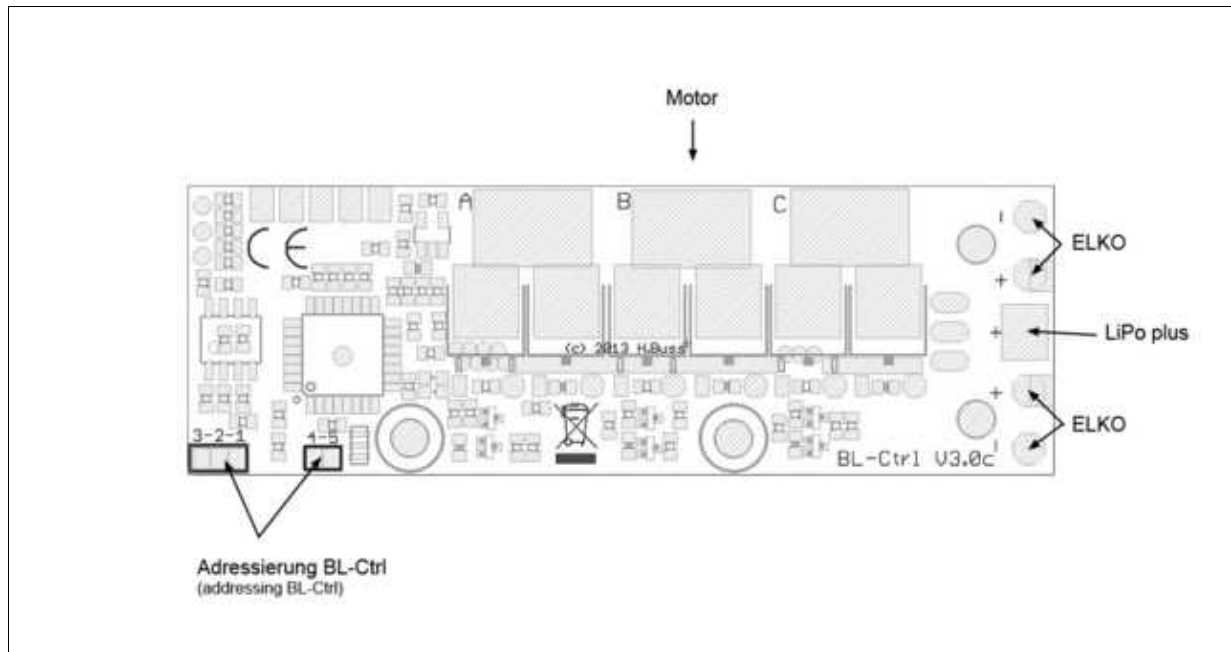
- Adjustable motor timing in several steps of 13-28° - compatible with the most common BL motors
- Adjustable switching frequency ( 10kHz - 20kHz )
- PPM to 500 Hz with simultaneous I2C - bus operation for telemetry and data logging
- Software adjustable direction of rotation
- Adjustable current and temperature limits
- Adjustable start-PWM
- Silent Start: test tone at startup can be disabled

## 1.4 Interface

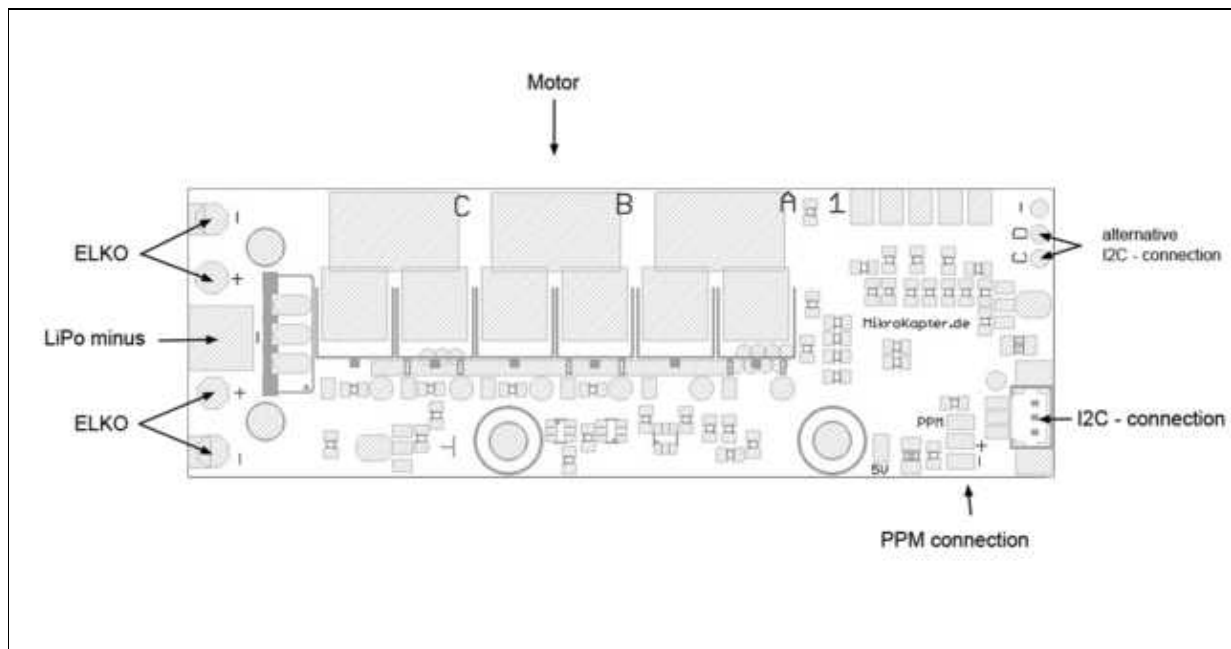
-  I2C-Bus with integrated opocoupler allows you to put the BL-Ctrl to the end of the rigger
- various interfaces for setpoint input ( I2C, PPM ( 500Hz ) , serial)
- Integrated current measurement measurement of the actual current and the used capacity on the Mikrokopter control
- voltage and temperature measurement with data transmission to the ground station and data logging
- 11-bit resolution (2048 steps )
- various feedback to the [MikroKopter-FlightCtrl](#) ( blocked motor , power limiting , etc. )
- extented configuration options (eg current limit , temperature limit , ...)
- two LEDs per BL-Ctrl (OK and Error )
- all BLCs are already adressed (address 1-8)
- I2C bus access possible in PPM mode - for data logging and telemetry in PPM mode
- status messages are transmitted to the FC ( engine blocks , Current, Self-test error ...)
- current measurement up to 75A per controller
- Convenient configuration of the BL controller via FC

## 2 Connections


### 2.1 Top



### 2.2 Bottom



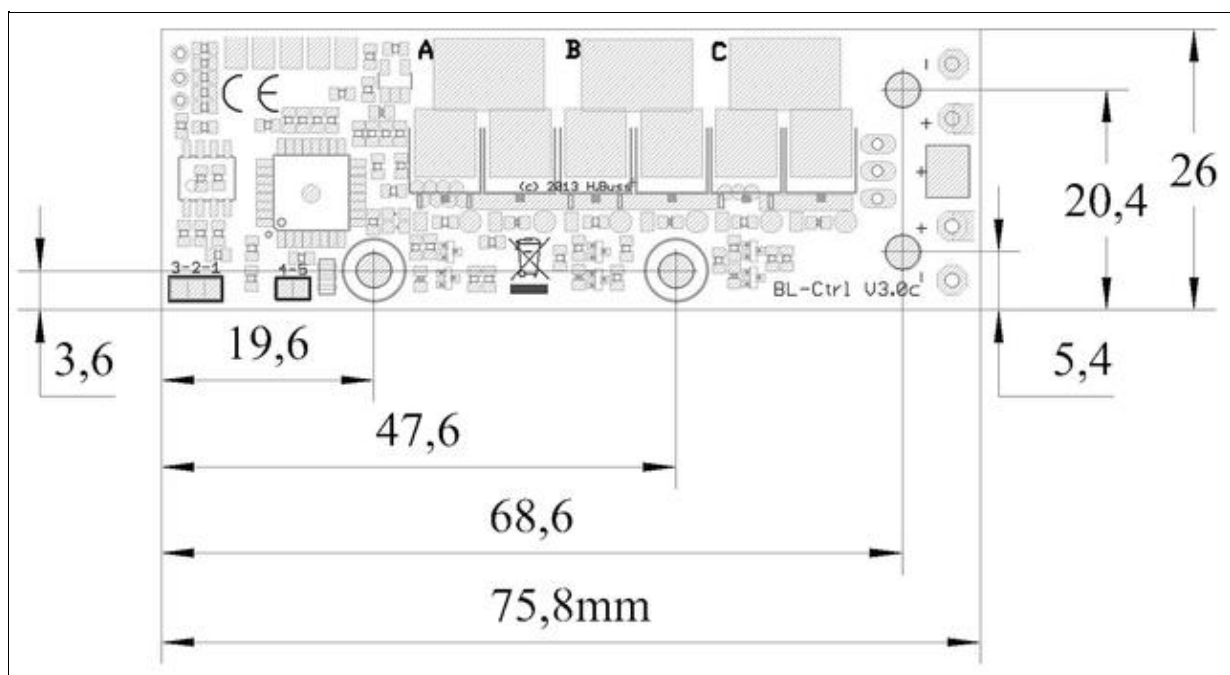
## 2.3 Connection

- Motor
  - ◆ => A, B, C
- Adressierung
  - ◆ => by solder Jumper BL-Ctrl (see below)
- Elko
  - ◆ => connect two capacitors 2x Elko 470 $\mu$ F/35V (Low-Impedance)
- LiPo-Connection
  - ◆ => LiPo plus / minus
- I2C
  - ◆ => Connect by 3-lines Molex cable or by soldering a 3-lines  cable

=> do not connect the GND-Line directly to the Minus-line of the BL-Ctrls -> go with the three lines (C, D and GND) to the FC and connect the GND there

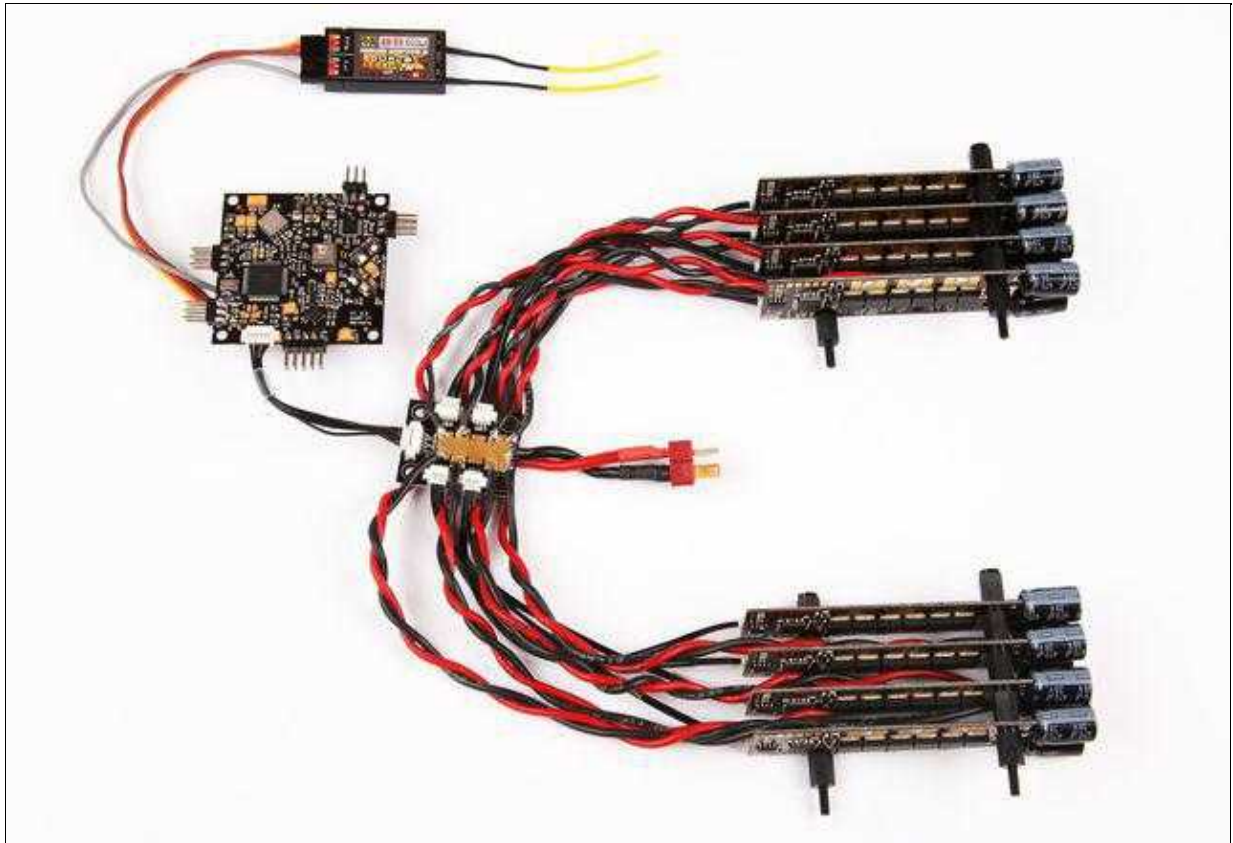
=> the easiest way to connect the I2C-Bus is to use the Molex (See also [en/Mini8](#))
- PPM (Alternative)
  - ◆ => PPM = orange / + = rot / - = braun => up to 500Hz

## 2.4 Dimension



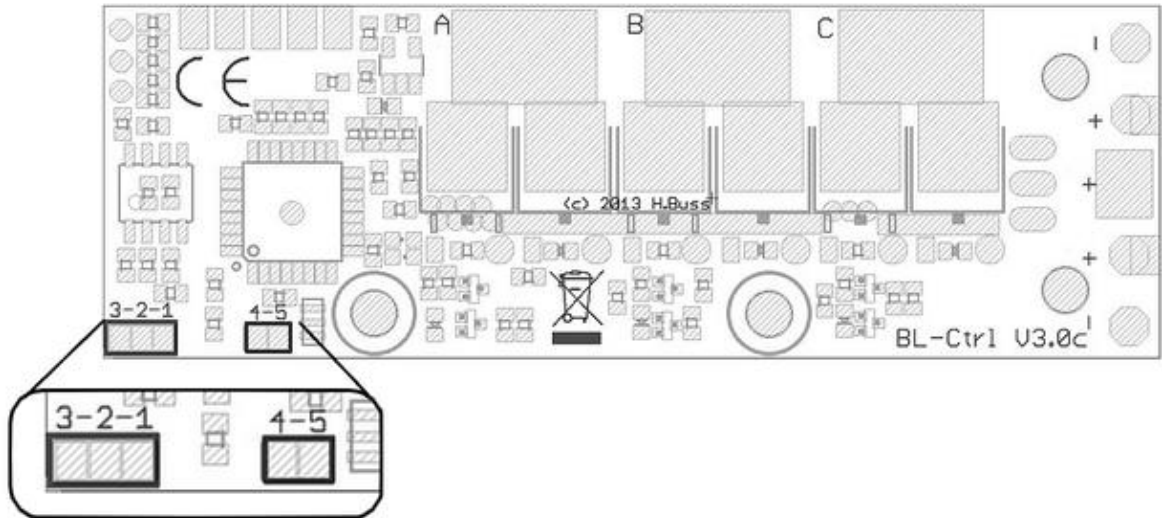


### 3 distribution board



See: [Mini8-PCB](#)

## 4 Adressing



### INFO

The addresses can be set in the range between 1 and 8. If you need addresses 9-12, please contact the shop



# 5 Settings

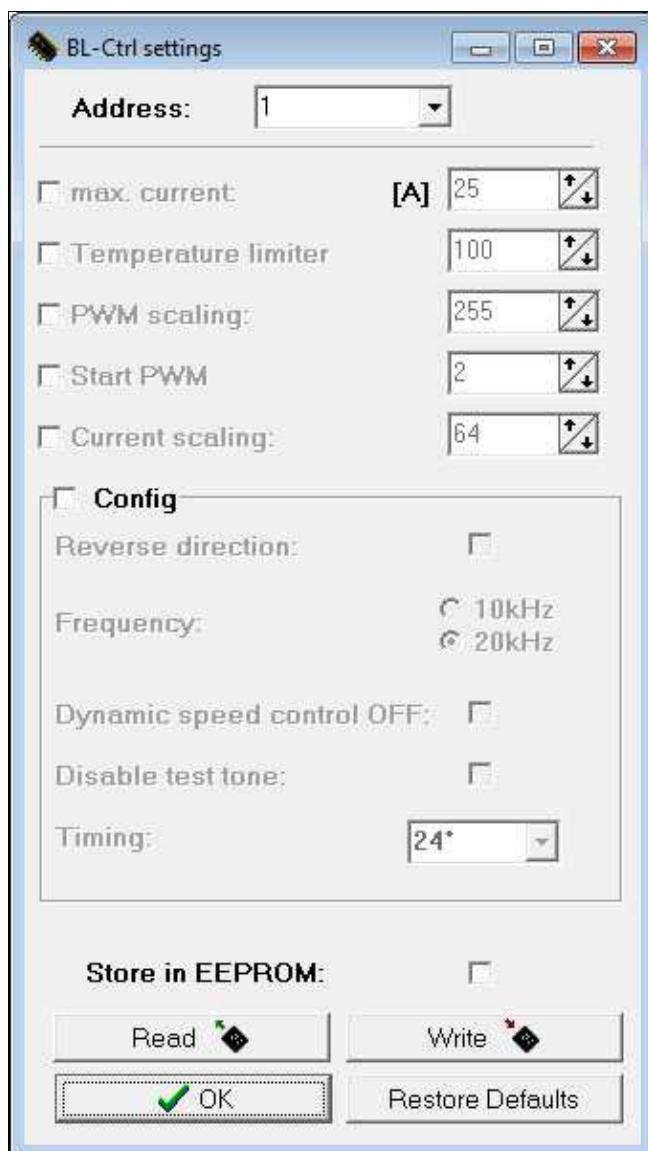
**IMPORTANT:** To change the Settings of the BL-Ctrl V3.0 you need a Software version since V2.02a ([KopterTool](#), [FlightCtrl](#), [NaviCtrl](#))!

Normally you have not to change the settings! If you have to to it you can do it like described:

- open [KopterTool](#)
- press button "Strg" on your keyboard and hold it down.
- Then "click" "Settings" in the [KopterTool](#).

Now you will see the window of the BL-Ctrl V3.0.

INFO: only if you "click" and activate the single settings there you can change them.



BL-Ctrl settings

Address: 1

max. current: [A] 25

Temperature limiter 100

PWM scaling: 255

Start PWM 2

Current scaling: 64

Config

Reverse direction:

Frequency:  10kHz  20kHz

Dynamic speed control OFF:

Disable test tone:

Timing: 24\*

Store in EEPROM:

Read Write

OK Restore Defaults



## 6 Error codes

The BL V3 performs a selftest during startup (test-tone). In case of an error, these are the blink codes:

- 1 "1" = Shortcut between A+ and B-
- 2 "2" = Shortcut between B+ and C-
- 3 "3" = Shortcut between C+ and A-
- 4 "E" = A doesn't go to high
- 5 "F" = B doesn't go to high
- 6 "G" = B doesn't go to high
- 7 "H" = A doesn't go to low
- 8 "I" = B doesn't go to low
- 9 "J" = C doesn't go to low
- 10 "K" = Overcurrent when switching to low
- 11 "L" = Overcurrent when switching to high
- 12 "Q" = Cross-circuit between low and high
- 15 overcurrent while starting the motor
- 16 error current measurement
- 17 error voltage measurement
- 18 error temperature measurement

## 7 SW-Update

If there is a new Software for the BL V3, here you can see how to update the BL: [Update](#)

# 8 FAQ

## 8.1 Motor connection

The motors can be connected either on the top-side or on the bottom-side. You can ignore the small (pre-)soldered points on the top-side.

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- [KategorieMK-Baugruppe/en](#)