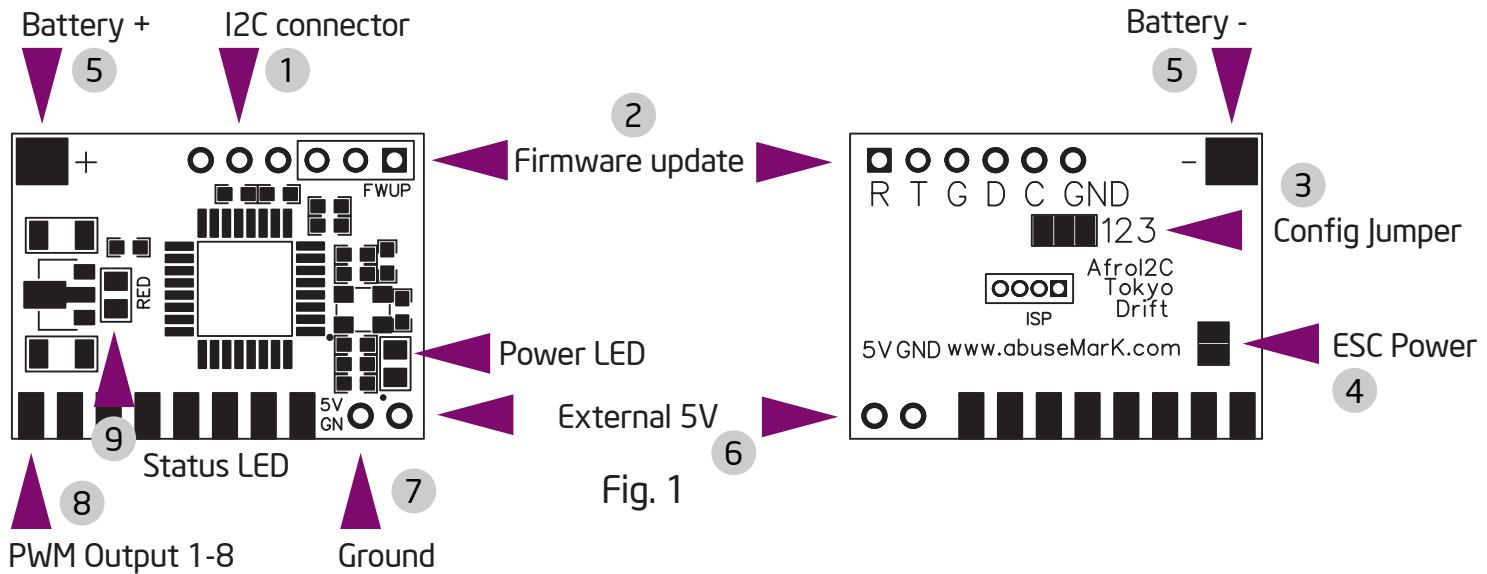


# I2C to PWM Converter “Afrol2C Tokyo Drift”

## Hardware and Connection

**NOTE** The converter ships pre-configured to be powered by 5V from 1st ESC



1. I2C connector. GND, SCL (C), SDA (D) pins from left to right. Connect these to C, D and Ground pads on Flight Control. For convenience, standard servo cable can be used. Black = Ground; Red = C; White = D.
2. Firmware update connector. TTL serial at 5V levels. GND, TX, RX pins from left to right. Can be connected to any TTL serial/USB converter. Serial parameters are 115200 baud, 8 bit, no parity, 1 stop bit. On power-up, startup message is output through this connector. Serial console can be used for advanced converter settings to adjust PWM timing and various other parameters. See “Advanced Configuration”.
3. Motor configuration jumper. All pads untouched (**default**) = Quad  
1-2 bridged = Octo  
2-3 Bridged = Hexa  
1-2-3 bridged = Tri
4. ESC Power jumper. When shorted, use 5V from first ESC. **This is default configuration.**  
Do **NOT** connect battery power ( 5 ) with this jumper in place.
5. Battery +/- terminals. Do **NOT** use if powering by 1st ESC or external 5V.
6. External 5V connector. Any other 5V power source. Can be taken from Flight Control, etc.
7. Ground connector. Used when external 5V power is used. Otherwise leave unconnected.
8. PWM output to ESC, standard pinout. Only the Signal pins are needed for operation if external power is used. At least one ground pad must be connected, either ( 7 ) or any of the PWM grounds.  
Top = Signal  
Center = 5V (only 1st connected)  
Bottom = Ground
9. Status LED

# I2C to PWM Converter "Afrol2C Tokyo Drift" Configuration and Usage

## Automatic ESC Calibration (Bind-Plug)

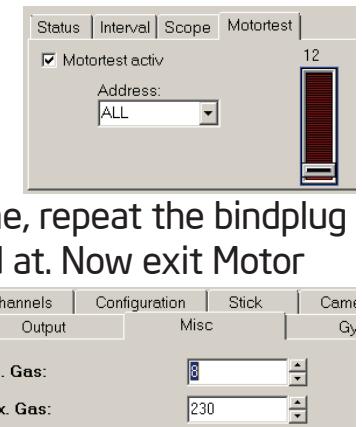
1. Disconnect I2C plug from the board (Fig.1 1)
2. Connect Bind-plug from your receiver (or short out pins D and GND)
3. Apply power to all ESCs and I2C converter.
4. Status LED (Fig.1 9) will blink, while controllers will make calibration beep sounds.
5. After status LED finish blinking and stays on, remove power and Bind-plug and re-connect I2C connector.
6. Each ESC must still be individually programmed to **Medium** or **High** motor timing and **low cut-off voltage** - bind plug calibration ONLY sets the throttle range.



**WARNING** Remove propellers or tie down the model before attempting ESC calibration.

## Minimum throttle setting for Mikrokopter

In order to avoid full motor stop when using converter with MK-FC, MinGas setting needs to be adjusted to a higher value. On main screen of MKTools, go to the "**Motor test**" tab, check the "**Active**" box, and select "**ALL**" for the address. With props removed, slowly increase the throttle slider until all motors start. If all motors don't start at same time, repeat the bindplug calibration. Note the value (**12** in this example) that the motors started at. Now exit Motor test and go to Settings, Misc tab. Replace the default Min Gas value of 8 with the number from Motor test + 2. So in this example, Min Gas would be set to **14**.



## Standard operation and Status LED

On power-up the Status LED (Fig.1 9) blinks rapidly for a few seconds, then blink more slowly to count the number of configured motors. If motor data is received from FC, Status LED will remain off. If I2C connection is interrupted (cable removed for example), motors will be put to emergency throttle setting (default 0) and Status LED will light.

1. Connect Standard ESC to PWM Output pins 1-8 (Fig.1 8)  
Motor #1 is left-most connector.
2. Calibrate and program ESC (Only needs to be done once)
3. Perform Min Gas setting for Mikrokopter (Only needs to be done once)
4. Fly around.

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## Advanced Configuration

### Firmware update using MK-USB

1. Using a servo cable or similar, connect converter to MK-USB as shown in Fig.2.
2. See [readme.txt](#) included with AfroFlash package for complete command-line instructions.
3. After typing in the update command, without pressing <Enter>, power up the board and press <Enter> key while the Status LED (Fig.1 9) is flashing.
4. After update is complete, disconnect power and MK-USB.
5. For more detailed instructions, see [readme.txt](#) included with AfroFlash package.

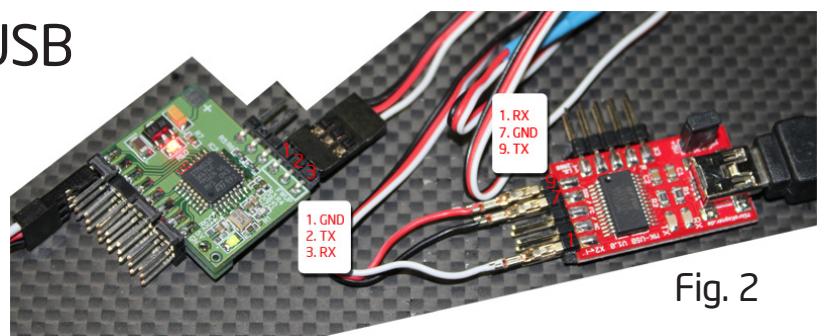


Fig. 2

### Using Serial Console

Connect a USB-Serial converter such as MKUSB the same way as described for Firmware update. Obtain a serial terminal program, such as PuTTY or TeraTerm Pro or HyperTerminal. In Fig.3, PuTTY is used as example. USB-Serial port is **COM4**, and speed needs to be set to **115200**. In Fig.4 below shows a sample serial console session. On power-up of converter, welcome message (1) is displayed. Pressing "?" and <Enter> key will show brief help message (2) and (3). Entering "i" displays current configuration (4). Things to note here is PWM period - 400Hz, pulse start/end times - 1000us to 2000us, number of configured motors - 4, and emergency throttle value. Emergency throttle is activated after ~100ms of no I2C data and will set all motors to this throttle value to allow more controlled descent. Obviously this should not be set above hover point. For commands that take parameters, enter command, space, and number. Backspace key does not work, so be careful entering numbers. For example to set PWM period to 250Hz, enter "p 250". If everything is OK, converter will print out the new settings. Once configuration is done, use the "w" command to write settings to EEPROM (5).



Fig. 3

```
COM4 - PuTTY

AfroI2C Tokyo Drift Console. Enter ? for help. (1)
? (2)
HELP: d (defaults) e (end) g (emerg) i (info) m (motorcount) p (period) r (reboot) s (start) (3)
i
400Hz timing (1000us to 2000us), 4 motors, Emergency throttle 0 (4)
p 250
250Hz timing (1000us to 2000us), 4 motors, Emergency throttle 0
s 1100
250Hz timing (1100us to 2000us), 4 motors, Emergency throttle 0
e 1950
250Hz timing (1100us to 1950us), 4 motors, Emergency throttle 0
w (5)
Writing config...
m
Motors: 4
g
250Hz timing (1100us to 1950us), 4 motors, Emergency throttle 0
r
AfroI2C Tokyo Drift Console. Enter ? for help.
```

**WARNING** Do not change PWM period, pulse start/end or emergency throttle with propellers connected or if you don't know what you're doing. Setting pulse start/end is **realtime**, and will take effect **immediately** on pressing Enter key. Incorrect setting can cause all motors to run at full throttle, etc.

Fig. 4