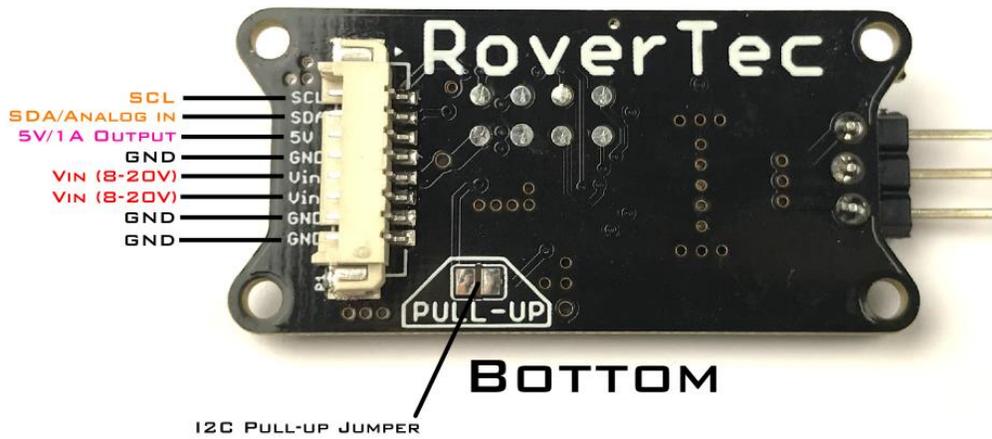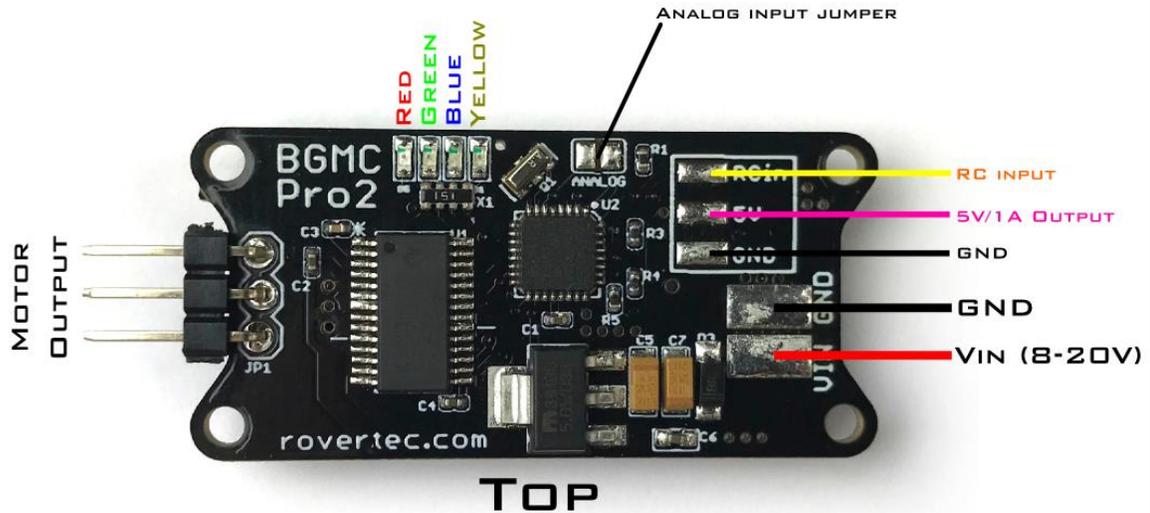# RoverTec BGMC Pro2 User Guide

Thank you for choosing the RoverTec BGMC Pro2! Connecting and using this motor controller is quick and easy. Please see the diagrams below for wiring information. These diagrams will be referenced throughout the rest of the user guide:

Input Power:
The BGMC Pro2 can be powered by any DC power source with a voltage between 8-20V. We recommend a voltage range of 10-16V for the best performance and thermal characteristics. You may power the BGMC Pro2 from one of two places: the solder pads on the top side of the PCB, or the 4 power input lines built into the 8-pin Molex Picoblade connector on the bottom of the PCB. If you choose to provide power through the Picoblade connector, please use all 4 power wires (both GND and both Vin).

Control:
You may operate the BGMC Pro2 with any one of the three available control input options: an analog voltage, a 1-2ms RC signal, or I2C.

-Analog Voltage Control (0-5V):
On the top-side of the PCB, you will see an Analog Input Jumper. If you would like to use a (0-5V) analog voltage to control the BGMC Pro2, you must create a solder bridge across this jumper with a soldering iron. <u>IMPORTANT: The BGMC Pro2 will not look for any other control input while this jumper is bridged. If you would like to switch to a different control input option, you must again use a soldering iron to remove the solder bridge.</u>

The analog input shares the same wire as the I2C SDA wire within the 8-pin Molex Picoblade connector (see diagram of bottom view). For your convenience, there is a 5V wire and a GND wire right next to the analog input wire, if you would like to control this device with a potentiometer. To do this, you would connect the GND wire to one side of the potentiometer, the 5V wire to the other side, and the analog wire to the center. An analog voltage of ~2.5V is considered the "center", and the motor will be stopped. An analog voltage less than 2.5V, all the way down to 0V, tells the motor to rotate one direction. An analog voltage greater than 2.5V, all the way up to 5V, tells the motor to rotate the other direction.

<u>Do not create a solder bridge across the "Pull-Up" jumper if you would like to use analog voltage control. This jumper is only used for I2C control.</u>

-RC-signal Control (1-2ms pulse signal):
If you would like to control the BGMC Pro2 with an RC receiver, servo tester, or Arduino using the pulseOut() function, use the 3 solder pads found at the top right of the PCB (see top diagram on previous page). These pads are spaced such that a standard 3-conductor servo wire can easily be soldered here. <u>If you want to use RC control, the Analog Input Jumper must NOT be bridged. It must be OPEN.</u>

An RC signal of 1.5ms tells the BGMC Pro2 to stop the motor. An RC signal less than 1.5ms, all the way down to 1ms, tells the motor to spin one direction. An RC signal greater than 1.5ms, all the way up to 2ms, tells the motor to spin the other direction.

-I2C Control:

The recommended method of controlling the BGMC Pro2 is I2C, as this method provides more options and much more precise, noise-free control. The motor controller chip can also be enabled and disabled using this control method, allowing the motor to "coast" when desired. The I2C wires are found on the 8-Pin Molex Picoblade connector, located on the bottom side of the PCB (see diagram). For your convenience, there are 4.7k pull-up resistors already on the PCB, along with a "Pull-Up" jumper located on the bottom of the PCB. If you already use pull-up resistors elsewhere in your I2C circuit and feel that you need no more, leave this jumper alone. If you need pull-up resistors or need a stronger pull-up, bridge this jumper to connect the on-board resistors. If you want to use I2C control, the Analog Input Jumper must NOT be bridged. It must be OPEN.

The I2C commands can be downloaded from the BGMC Pro2 product page, along with an Arduino library and some example Arduino sketches for your convenience.

LED Codes:

The red, green, blue, and yellow (RGBY) LEDs on the BGMC Pro2 certainly seem like they have a lot to say, as they flash wildly as the controller operates. All of those flashes actually mean something though. Let's take a closer look:

-R-G-B-Y-B-G-R (fast):
This quick light sequence is played whenever the BGMC Pro2 is first powered up.

-R + B (0.5 seconds):
This "purple" light confirms that the Analog Input Jumper is bridged and the controller will use the analog input as the control input.

-Green flashing (6x):
This indicates the BGMC Pro2 is searching for an RC signal. You will not see this flashing if the Analog Input Jumper is bridged.

-Blue flashing (6x, after Green flashing):
The controller has looked for an analog signal and an RC signal, and is now switching to I2C mode.

-Solid Green:

The BGMC Pro2 is operating in analog voltage input mode.

-G + B (solid):

The BGMC Pro2 is operating in RC signal input mode.

-Red:

Illuminates only in RC signal or analog voltage mode, when the input signal is in the middle.

-Solid Green with brief Blue flashes:

I2C mode is enabled. In this mode, any time a new command is received, the Blue LED will flash very quickly.

-Yellow:

Only seen in I2C mode. This indicates the motor controller chip is disabled, and the motor should be free to "coast".

We at RoverTec would like to thank you for your purchase, and hope that you enjoy the BGMC Pro2. Please send and questions or comments to support@rovertec.com.