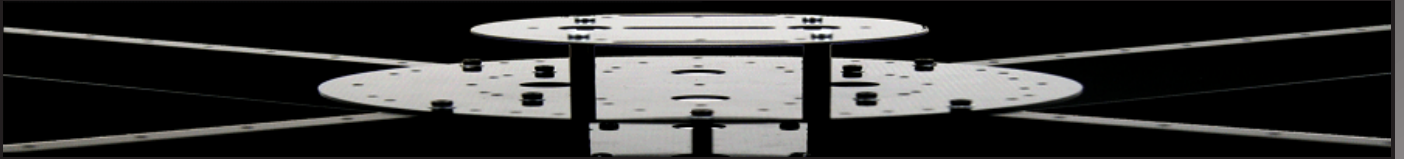# Vulcan LED
DayBright MultiCopter Lighting System
Manual V1.01

Thank you for purchasing the Vulcan DayBright high performance LED system for multicopters!
This manual will describe how to safely use the various features of the LED controller. Please ensure you read this manual in full before fitting or operating your lighting system.

SAFETY NOTICE

It is your responsibility to ensure that you operate the DayBright controller and LED modules within their stated specifications. Failure to do so could result in permanent damage to components, battery packs, property or personal injury. Vulcan UAV Ltd can not be held responsible for misuse, intentional or otherwise, of our products.

Please ensure you observe the following safety points:

• The DayBright controller can reach temperatures in excess of 80°C under high loads (ten light modules or more, total load over 2.5A) and may burn skin or damage heat sensitive components.

• The lighting modules can reach 60-80°C during operation. This is normal, due to the very high light output and high current operation.

• Disconnect the LED battery when storing your model to prevent over-discharge.

• Do not stare into the light modules or view through optical instruments whilst on - they are intensly bright and may hurt your eyes.

• Always range check your model with the lights running after installation to ensure there is no interference.

Description

The Vulcan DayBright controller is a high performance microprocessor controlled, remotely operated LED driver and light sequencer. It contains an integral high voltage, high current switching power regulator and drives four output channels for navigation and strobe lights.

The controller will convert a wide input voltage range into the 5V supply the LEDs require, and can supply up to 4A of current. The LED power supply is isolated from that of the receiver to protect your radio gear from the high current draw of the light modules. All battery types are supported, including Lithium Polymer, with a voltage range of 6 - 42 volts (2-10S LiPo packs).

The controller can learn the transmitter signals you want to use to switch the lights, making it easy to integrate with your aircraft. There are 28 flash patterns pre-programmed, some of which include Rotating Beacon simulation.

The controller's operation is set via the small rotary control dial located on the front top right side of the controller. A small, flat-head screwdriver is needed to move the dial. It can turn approximately 3/4s of a turn between the end-stops - be gentle, excess force will damage the dial.
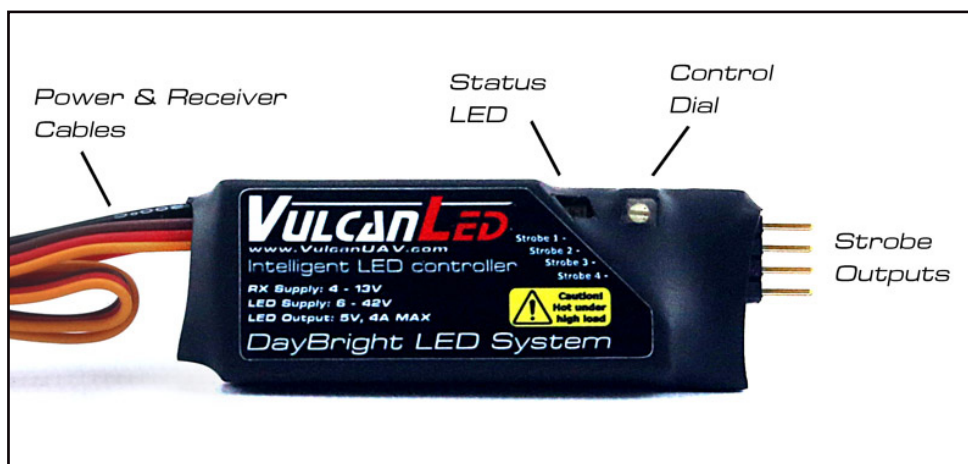
Installation

The unit should be fixed in position with double-sided foam tape, self-adhesive Velcro or cable ties so that it can't move around in flight whilst also minimising the controller's exposure to vibration.

Try and avoid placing the controller or it's leads too close to your receiver or receiver aerials to minimise the risk of interference. Remember to range check your model with the lights running.

It is important to remember that the controller generates heat during operation, proportional to the number of lights it is running. Mounting it where cooling air can flow over it is required if running more than 10 light modules (2.5A total load).

The light modules should be plugged in with the connector vertical and black wire on top. The light modules will only work if the polarity is correct, but they will not be damaged if they are briefly plugged in backwards.

There are four sets of pins for the lights, one for each independently controlled strobe lights. The output pins will also accept normal servo plugs inserted vertically with the black (negative) wire on top.

If you require more lights than there are sockets, you can use standard servo Y-leads, providing you do not exceed the current handling capabilities of the controller.

Operating Modes

The controller has three modes of operation, which are described in the following sections. The position of the control dial when receiver power is turned on determines which mode the controller starts in.

The controller recognises three control dial positions:

Position 1: Anti-clockwise limit

Position 2: Center position – slot horizontal

Position 3: Clockwise limit

Remember not to force the dial - if you feel resistance you have reached an end-stop.

Position 1 - Learning Mode

The controller can learn the transmitter signal levels that you want it to switch at, as well as the safe cut-off voltage for your chosen power source.

The learning procedure is as follows:

1. Plug everything in as it will be set-up on the model. Ensure your LED battery is fully charged, and is the same one that you will use in the model.

2. With the power OFF, turn the control dial to position 1.

3. Turn on your transmitter and configure the channel you wish to use to control the lights.

4. Set the transmitter channel to the "lights off" position.

5. Turn on LED power followed by receiver power. All the LEDs will flash 5 times to indicate you have entered learning mode.

6. The controller will measure the LED battery voltage and remember a safe lower voltage limit derived from this (75% of the measured voltage or 3.15V per cell for LiPo batteries).

7. After 6 seconds, the controller will record the "lights off" value and flash all LEDs once.

8. Move the transmitter control to the "nav and strobes on" position. After 3 seconds the controller will record this value and flash all the LEDs twice.

9. Move the transmitter control to the "landing lights on" position. After 3 seconds the controller will record this value and flash all the LEDs three times.

10. All LEDs will then light for a one second long flash to indicate that you have finished.

11. If you are happy with the settings, move the control dial to position 2 and the controller will store the settings and move to normal operation. If you are not happy with the settings, remove receiver power without mov-

Position 2 - Normal Operation

During normal operation, the controller will switch the navigation, strobes and landing lights based on the stored transmitter signal levels. If you haven't gone through the learning mode, these will default to values that are compatible with a transmitter channel operating from a three position switch, and a 2 cell lithium polymer battery pack.

The controller constantly monitors the voltage level of the LED power source. If this level drops below the stored cut-off voltage (by default 6.3V - safe for a 2S LiPo battery), the power supply is placed into standby, the LED modules are turned off and the controller's status LED will flash twice a second. The LED battery should be disconnected to prevent over-discharge.

The controller will go into standby mode if it has been powered up for more than thirty minutes (even if the LEDs are turned off) to prevent excessive heat buildup. The status LED will flash once every two seconds. Even when the LEDs are off, the power supply draws a small current from the LED battery pack - please disconnect when storing your model.

The controller comes with 28 flash patterns programmed, some of which incorporate "rotating beacon" functionality – this simulates a light with a rotating mirror that some aircraft use instead of a strobe light. To select the flash pattern, turn the control dial to position 1 or position 3 to move up and down (respectively) through the flash patterns. Each pattern will run for five seconds before moving on to the next so you have time to see what it looks like. If you want to keep the current pattern, move the dial to position 2 and the controller will store the setting and resume normal operation.

Position 3 - Reset Defaults

Selecting this mode on startup will reset the controller to it's factory default settings for flash pattern, receiver signal levels and battery cut-off voltage. Use this mode if you accidentally store incorrect settings during the learning mode. The LED output when this mode is selected is a test pattern that is used to ensure the circuitry is fully functional for quality control after manufacture and can be ignored.

No:	Light 1	Light 2	Light 3	Light 4	Notes
1	Long Flash	Long Flash	Long Flash	Long Flash	
2	Long Flash Off	Long Flash Off	Long Flash Off	Long Flash Off	Opposite of No 1
3	Double Short Flash	Double Short Flash	Double Short Flash	Double Short Flash	
4	Double Short Flash Off	Double Short Flash Off	Double Short Flash Off	Double Short Flash Off	Opposite of No 3
5	Short Flash	Short Flash	Short Flash	Short Flash	1, 2 and 3, 4 alternate
6	Short Flash	Short Flash	Short Flash	Short Flash	Opposite of no. 5
7	1/4s Flash	1/4s Flash	1/4s Flash	1/4s Flash	Chase Sequence
8	1/4s Flash Off	1/4s Flash Off	1/4s Flash Off	1/4s Flash Off	Opposite of No 7
9	Long Flash Off	Long Flash Off	Long Flash Off	Long Flash Off	1, 2 and 3, 4 alternate
10	Long Flash	Long Flash	Long Flash	Long Flash	Opposite of No 9
11	Fade in flash	Fade in flash	Fade in flash	Fade in flash	1, 2 and 3, 4 alternate
12	Fade out flash	Fade out flash	Fade out flash	Fade out flash	Opposite of No 11
13	Fade in flash	Fade in flash	Fade in flash	Fade in flash	Chase sequence
14	Fade out flash	Fade out flash	Fade out flash	Fade out flash	Opposite of No 13

Programs 15-28 are identical to programs 1-14, except that the strobe 1 and 2 channels are constantly lit. Strobe channels 3 and 4 follow the programs as described.

LED Controller Spec

Receiver Supply Voltage	4v - 13v
Receiver Supply Current Draw	100mA
Controller Supply Voltage	6 - 42v
LED Power Output	5v 4A Max
Dimensions	75 x 24 x 17mm
Weight	30g

If you have any questions about this product, please don't hesitate to contact us!

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