



## Jet Magic with Afterburner

### OVERVIEW

#### AIRCRAFT LIGHTING -

Jet Magic gives you control of your R/C airplane's LED scale lighting plus an authentic looking led driven afterburner. Jet Magic allows you to separately control your airplane's navigation lights, flashing beacon and landing lights from your transmitter using any spare toggle switch. Simply flip the switch once, and the navigation lights will light up. Flip it again and the beacon will begin to flash. Flip it a third time, and the landing lights come on. Flip the switch once more and all of the lights will go off.

#### AFTERBURNER –

Jet Magic's afterburner consists of 30 leds on a 5mm adhesive strip intended to be formed into a ring in your jet's fan exhaust. Plug the two pin connector onto the header labeled "AB" and your throttle will control the brightness of the led ring.

Jet Magic is powered by your airplane's main propulsion battery. Plug the battery into the 2 pin connection (header) labeled BATT. Be sure to observe the correct polarity or Jet Magic will not operate. Jet Magic allows you to use aircraft propulsion batteries of up to 30VDC (volts direct current). Do not exceed 30V or Jet Magic will be damaged and the warranty voided.

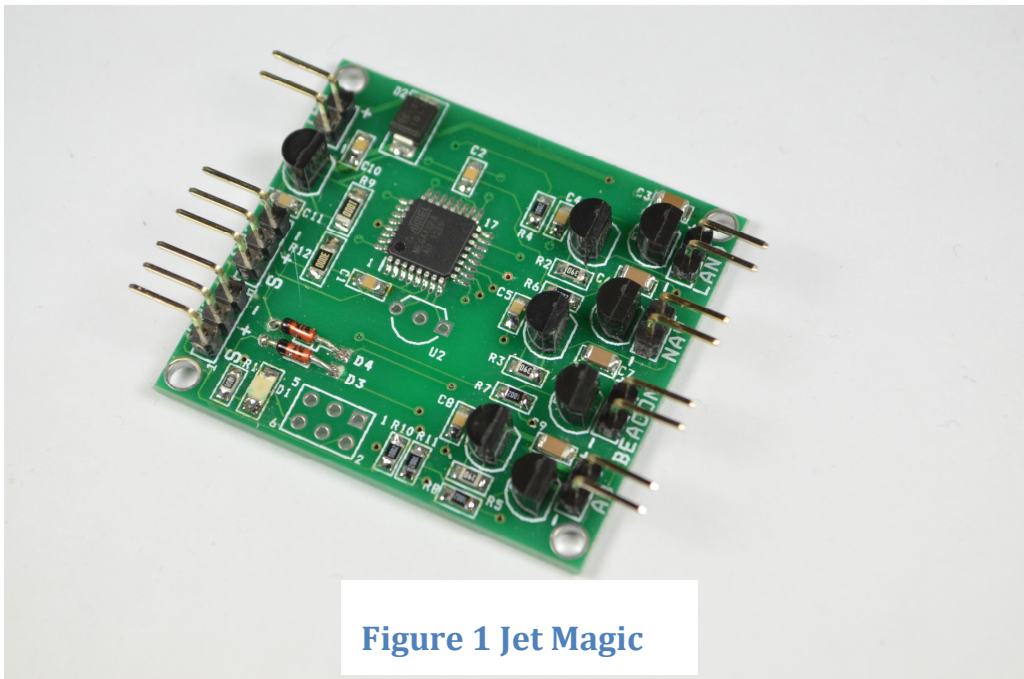


Figure 1 Jet Magic

## INSTALLATION AND OPERATION

### CONFIGURING THE TRANSMITTER AND RECEIVER -

You must configure your transmitter and receiver to allow Jet Magic to work. Following the instructions in the transmitter operator's manual, configure a toggle switch to use a spare channel. Switch selection varies with the make and model of the transmitter, but most have an unused switch that can be assigned to a spare channel. Channel 5 or Channel 7 are often used in lieu of gear or flaps.

### CONNECTION-

Connect the channel that you have selected on the receiver on the R/C airplane to the header labeled "CH5" on Jet Magic (Figure 1). Use three conductor wire with three position female headers. Be sure to observe correct polarity. The black wire connects to the (-) post and the wire containing the signal (white or orange) connects to the (S) post. You must also connect your throttle to Jet Magic with a "Y" cord or splice. A "Y" cord used for twin engine operations is often used for this, but you may also splice into the wire between the throttle on the receiver and the speed controller. Connect this wire to the header labeled "CH3".

You must install the wiring between your propulsion battery and Jet Magic. You must fabricate and install a power lead from the battery harness. The battery wire should terminate in a two pin female 0.1 inch pitch connector. Be sure to observe the correct polarity. Connect the red wire to the battery positive (+) terminal and the black wire to the battery negative (-) terminal. Be sure to make the battery connection between the battery and the motor ESC (electronic speed controller). Most people prefer to solder a permanent connection right to the battery terminal connection wiring on the ESC. Be sure that the connection is securely soldered and insulated to prevent short circuits. Maximum battery voltage is 30VDC (volts direct current). If you connect a battery with voltage higher than 30 VDC, Jet Magic will be damaged. If you inadvertently connect Jet Magic backwards (reverse polarity) its protection circuitry will protect it from damage, but it will not work.

Connect your position (nav) lights, flashing beacon and landing lights to the labeled headers with 2 pin female headers. The Scale Led Lighting Kit (<http://lakemicrosystems.com/products/scale-lighting-kit>) has the wire, connectors, and superbright leds you will need). Connect the afterburner connector to the header labeled "AB."

When Jet Magic is powered up, the on board LED will flash twice. When Jet Magic senses the correct signal from the switch you have chosen for lights, the controller will flash the on-board LED once every time it receives a signal from the switch on the transmitter.

**BATTERY USAGE** - Remember, LEDs use electrical energy, your battery will be depleted faster than it would if you have no lights. In the usual installation, navigation lights, flashing beacon and landing lights will consume approximately 75 milliamps of current. The afterburner will consume approximately 200mA. This is normally only about 5% of the energy consumed by the motor, but it will decrease the amount of time you can fly after reaching a low battery condition. Experimenting with the system while the R/C airplane is safely on the ground will assist in determining the right timing and battery reserve required.

**WIRING YOUR LED'S-** If you Scale Lighting Kit with your Jet Magic, you have lights that were designed to work with Jet Magic. Each set of LED's should be connected to the labeled connector header on Jet Magic. Power for each LED string is supplied by a separate constant current controller which has been

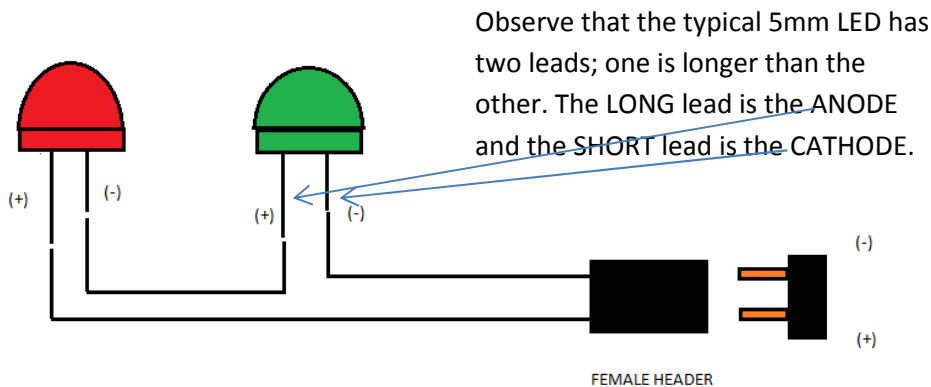
factory set to provide 25 milliamps of current. This insures that each LED string is supplied with the amount of current that is optimal for its operation. The leds used for aircraft lighting (nav, beacon and landing lights) do not require current limiting resistors. For a detailed explanation of led installation, see: <http://lakemicrosystems.com/add-led-lighting-to-your-scale-rc-aircraft>.

Jet Magic requires a minimum battery voltage of 12v (11.1 or 3S) to operate at full brightness. The afterburner connection on Jet Magic (header labeled "AB") is designed for strip leds with built in current limiting resistors (supplied with Jet Magic). **If you connect leds with no current limiting resistors (e.g. the nav lights, landing lights and beacon) to this header, you will most likely destroy them.**

Jet Magic can operate other LED configurations as long as all LED's on the string are rated for continuous current greater than 25milliamps. The constant current controllers on Jet Magic are designed to drive LED's wired in series, as shown on Figure 2. The number of LED's that each output circuit on the unit can drive is dependent on the forward voltage drops of the individual LED's in the string. The voltage available from the battery should be 1.5 volts higher than the sum of the forward voltage drops of all the LED's on a string of LED's.

| Color  | Forward Voltage |
|--------|-----------------|
| White  | 2.5-3.5         |
| Red    | 1.7             |
| Green  | 2.5             |
| Blue   | 5.5             |
| Yellow | 2.2             |

Typical forward voltages for common LEDs



**Figure 2- Series Connection of LEDs.**

## TROUBLESHOOTING-

Board LED does not flash twice when connected to power:

1. No power to board. When you first power up Jet Magic, the on board LED will flash twice indicating that the board has successfully powered up. If the LED does not flash twice, there is a problem with the power supply to the board.

Possible Causes:

- a. Wiring incorrect, no continuity between battery and board
- b. Low battery voltage
- c. Battery polarity reversed

Lights will not turn ON/OFF:

1. No signal from the transmitter or the signal has not been received by receiver. When Jet Magic receives the correct signal from the transmitter, it flashes the on board LED once for every activation of the switch on the R/C transmitter. If the LED does not flash when the switch is activated, the board has not received a signal from the transmitter.

Possible Causes:

- a. Transmitter is not ON.
  - b. Transmitter is not correctly programmed to send the signal from the switch to channel 5. (or the channel you have chosen to operate the lights).
  - c. The transmitter and the receiver are not properly bound. See owner's manual.
  - d. No power to the receiver or the receiver is wired incorrectly. The LED on the receiver must be ON. Check the receiver wiring to assure that the receiver is getting the proper voltage and polarity.
  - e. Signal wiring to Jet Magic SIGNAL pins not connected or incorrectly connected. Insure that the 3 pin connector from the receiver is on Channel 5 and that the connector is correctly placed on the CH3 CH5 pins.
2. Wrong signal received. If the wrong signal is received, the LED on the Controller will not flash when the switch is moved. If this happens, review the transmitter operator's manual to make sure that you have programmed the transmitter correctly. Also, insure that the signal wire from Jet Magic is inserted into Channel 5 on the receiver (or the channel you have chosen to operate the lights).
  3. LED's wired incorrectly. The LED's must be wired such that the (+) side of the LED connector on the board connects to the anode of the first LED. Subsequent LED's are in series with the first LED, as shown in Figure 1.
  4. LED's failed. A typical 5mm LED that is exposed to continuous current in excess of 25mA will fail permanently. Actions such as testing an LED with a battery will kill the LED unless there is a current limiting resistor in the battery circuit.

## ONE YEAR WARRANTY

Jet Magic is warranted against failure due to defects in manufacturing for a period of one year from the date of purchase. Simply return your unit to Lake Microsystems with a copy of your original purchase receipt, and your Jet Magic board will be replaced or repaired. This warranty is exclusive and is intended to supersede all other warranties, express or implied, including the warranties for fitness for purpose and merchantability, or for consequential loss.