

Deluxe Color-Changing R/C Afterburner Light Kit For Turbine or EDF Jets

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<http://www.hyperdynelabs.com>



Congratulations on purchasing the afterburner light kit. Your kit is hand assembled in the USA, and we appreciate you supporting our products.



Your AB kit was manufactured using the highest-grade components available, please handle it with care as not to damage any of the components from static electricity. If you are not familiar with static electricity handling procedures, please refer to ESD procedures. Basic information on ESD can be found here:

http://en.wikipedia.org/wiki/Electrostatic_discharge

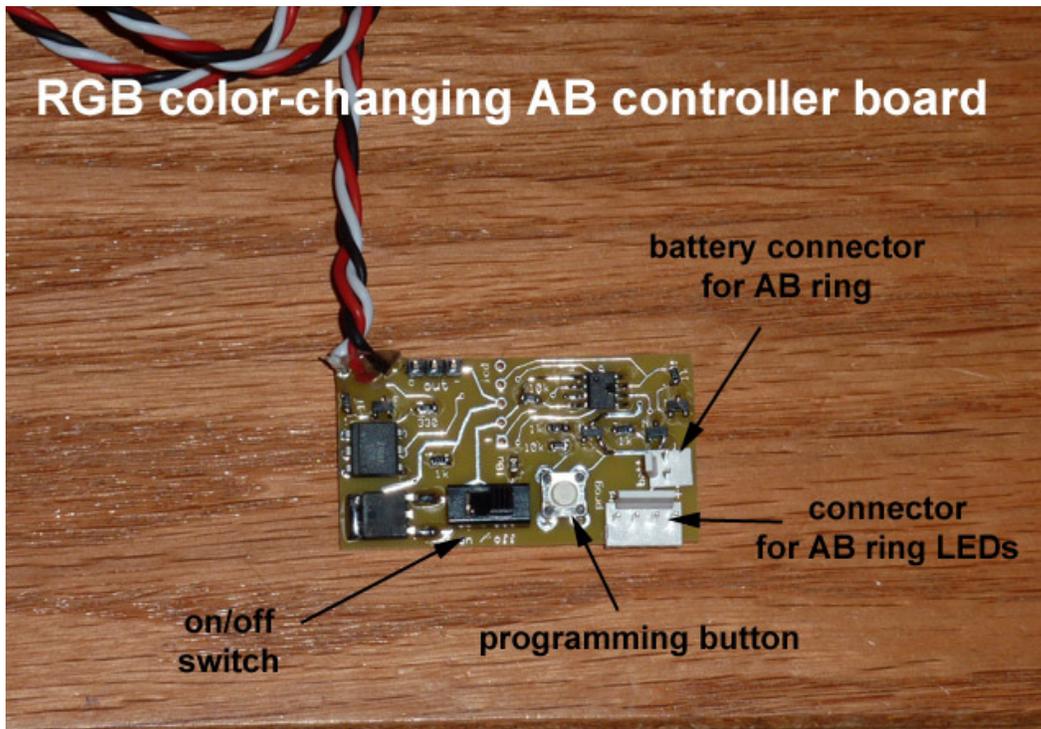
The afterburner light kit includes the following features:

- Color changing afterburner ring emulates proper afterburner jet effect based on throttle position.
- EDF friendly - unit runs off batteries from 3s lipo packs up to 8s lipo packs
- Afterburner trigger point is programmable.
- Throttle signal is buffer isolated from Rx and ECU – provides max protection
- Programmable special effects include different color profiles, AB scintillation + flash effect
- Custom burner LED ring cut/assembled to match your exhaust tube
- Can be used with existing receiver on an unused channel (linked to throttle) or y-cabled to your throttle channel.
- Long length ribbon cable attached for flexible install
- Lightweight

PACKAGE CONTENTS

Your RC afterburner board comes with the following:

1. Assembled AB controller board
2. Male servo wire
3. 4-conductor extension ribbon cable
4. 2-pin power cable with keyed connector
5. 4-pin LED cable with keyed connector
6. Custom RGB LED strip for afterburner ring (different type strips are available)



NOTE: Do not install the bare PC board on a metallic or conductive surface! Doing so can short out and damage the board. You can use heat shrink, electrical tape, or servo tape to protect the board if necessary.

FINISHING THE KIT CONNECTIONS

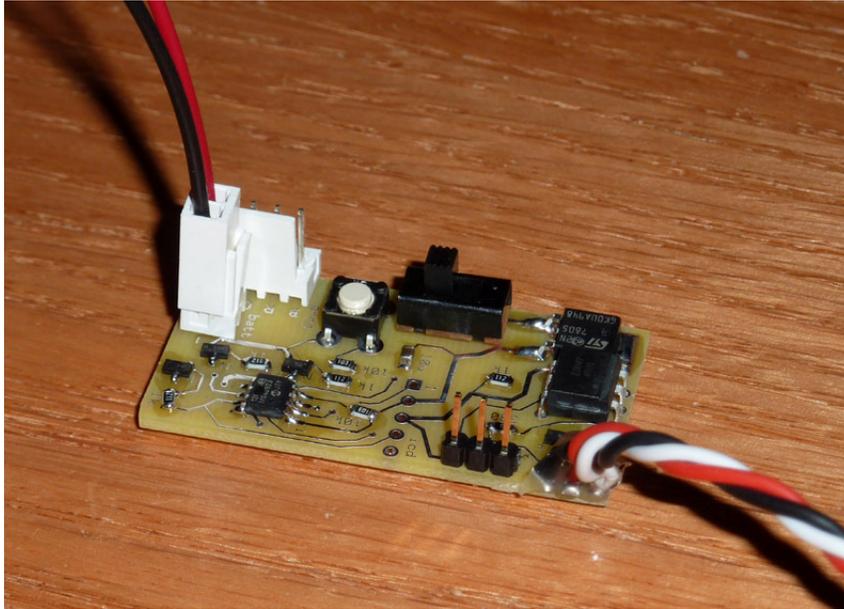
You will have to wire in a battery to power the LEDs and wire up the LED strip to the controller board using ribbon cable. The kit includes cables with keyed (one-way) connectors to interface with the board. You can custom measure the amount of cable you will need to run from your exhaust cone(s) to the controller board.

Tools needed: Scissors, wire strippers, soldering iron, solder, needle nose pliers, hot glue gun, exacto knife.

CONNECTING BATTERY POWER TO LIGHT BOARD

You will have to wire in your battery to the AB controller board so it has power to run the LED lights. The controller board will receive 5V power automatically from your Rx battery or BEC to power the microprocessor onboard. **NOTE: Do not run over 6V into the controller board's servo input!**

Simply splice your battery into the red (+) and black (-) power wires. The batt connector on the AB controller board is keyed, so the wiring harness will only fit one way. Here is a picture showing the proper connection.



A sufficient battery is any lipo, li-ion, or nimh pack with 11V or higher and at least 500mAH of capacity.

TURBINE INSTALL: You can use any battery that is 11V or higher (up to 30V). Note the light strip will not work on 7.2V packs typically used for smoke systems or FADEC/ECU.

EDF INSTALL: You can wire the main system battery directly into the controller board (limited 3s-8s operation).

For either install, you will just have to set up the proper cell count after you power up the board. The board defaults to 8s so on initial powerup you don't blow up the power strip if using a large battery. See below for programming the board.

NOTE: Double check the connections, reversing the wires can damage the board!!

CONNECTING SERVO CABLE TO YOUR RECEIVER

You can use the existing throttle channel if you use a Y-cable to split the servo signal between the afterburner board and your ESC (y cable is not included). Or if you have a mixing radio, you can use an aux channel and link it to your throttle channel. Either method will be fine. If you have an aux channel free, consider using it.

NOTE: Abide polarity when plugging the connectors into your receiver and servo. The orange (or white or yellow) wire is the servo signal wire. The black or brown wire is ground.

USABLE TYPES OF LED RINGS

You can use any type of RGB or single-color LED strip with our controller board (flexible or rigid). The strip must work off of 12V DC nominal and have a current draw under 3A total (red, green, blue all active). You can also custom wire up your own LED ring if you like!

Here are two RGB LED strips we use, the standard one has 9 LEDs/ft and the high-density one has 18 LEDs/ft. The standard strip used is the 18 LEDs/ft. Strips can be custom purchased with silicon casing (waterproof) or standard bare (non-waterproof) PCB flex material.

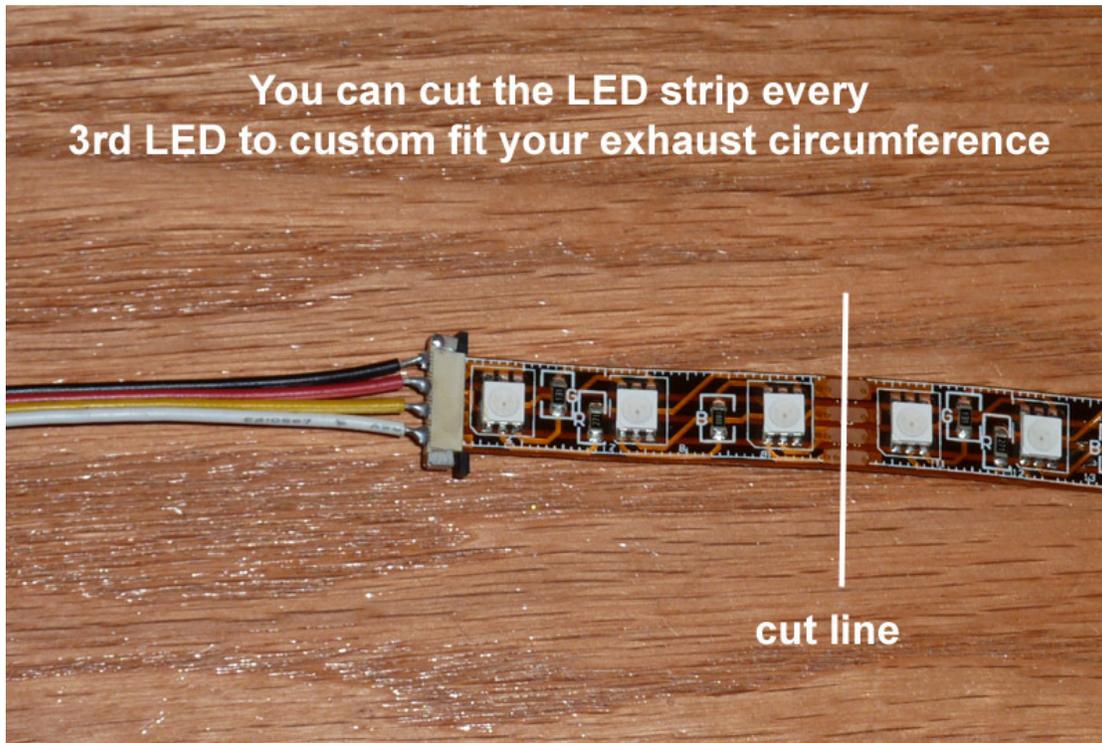


TRIMMING THE AB RING

First you can test fit the LED strip it into your exhaust, tailcone, etc.

You can trim the LED strip with scissors, BUT you have to trim it at certain locations. Every 3rd LED you will see a patch of large traces. You can trim the AB ring to length at one of these locations. This will ensure the other LEDs still light up.

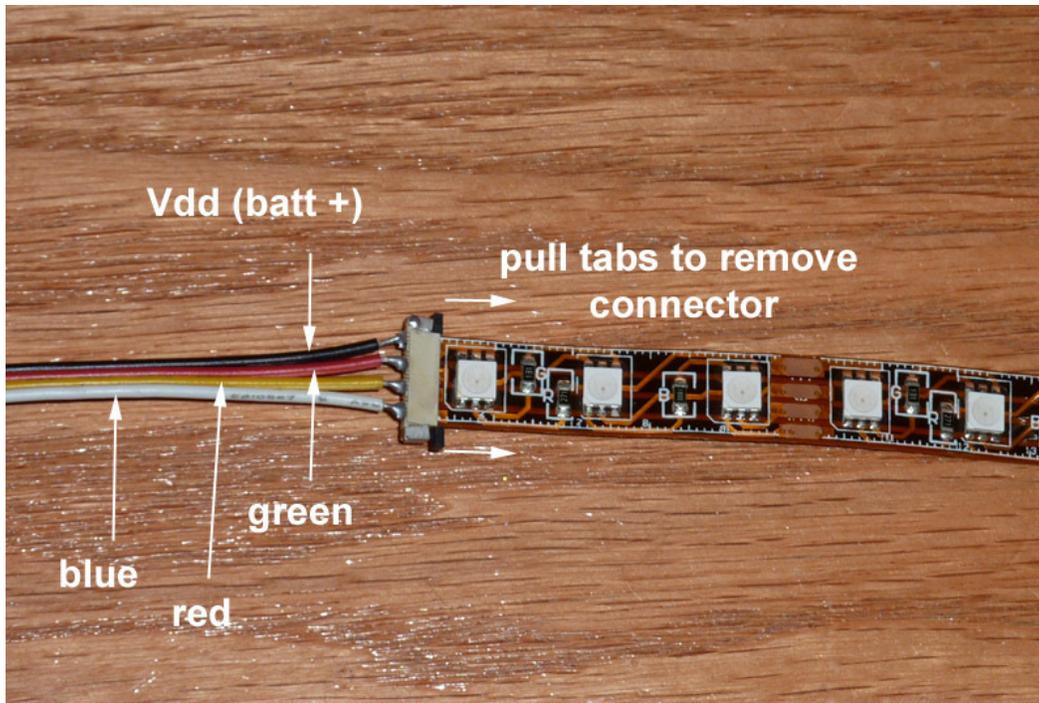
Here is a picture of a cut line on the strip. Work from the end of the strip and cut the strip to length that meets your exhaust circumference at the first available cut line.



You can discard the left over piece from trimming. The strip will now light up with no LED gaps once connected.

WIRING UP THE AB RING

The LED strip comes with a small header that attaches to one end of the strip for contact. Here is a picture of the connector and LED strip.

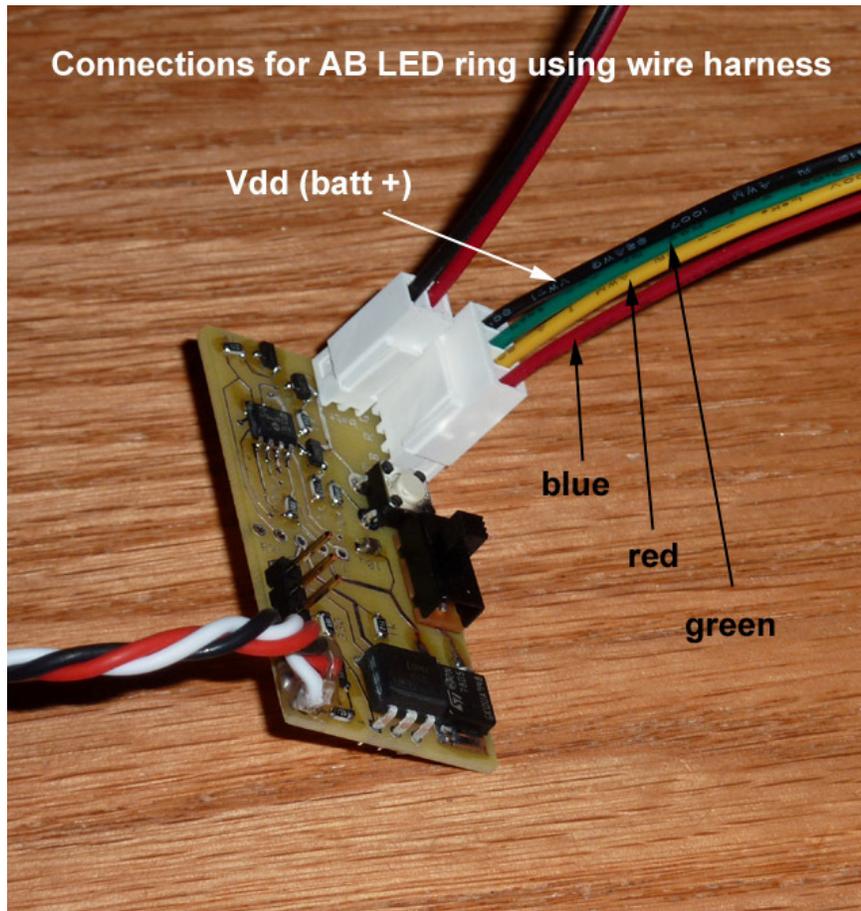


NOTE: You can remove the header by pulling the black tabs toward the strip and removing it.

The above picture also shows you which wires control which color. You will match this up with the wiring harness on the controller board.

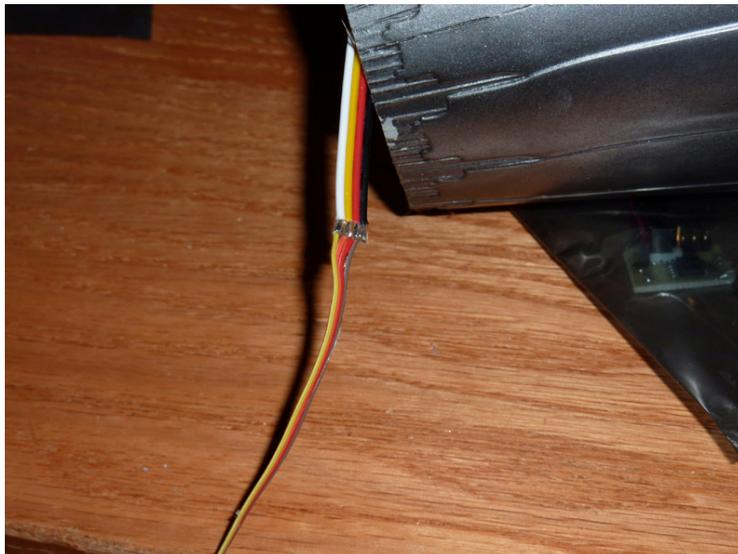
Your kit also comes with a 4-pin wiring harness with keyed connector. This is for attaching your LED ring strip to the controller board. As before, the connector is keyed and only attaches to the connector board in one direction.

Here is a picture of the connector and which color on the strip they connect to:

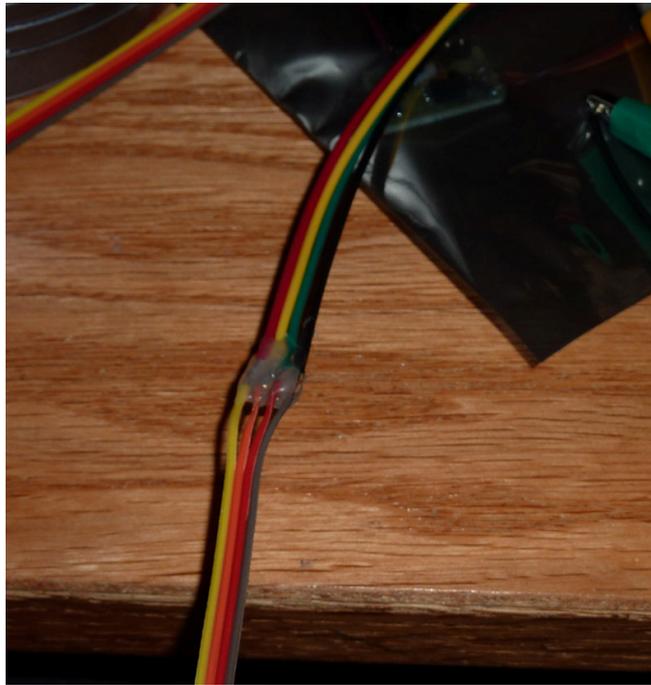


Your kit also has extra ribbon cable for connecting these two harnesses over the length that you need. Typically the controller board will reside up front somewhere near your Rx. Take the ribbon cable (the color of the wires doesn't matter as long as you connect them up as shown).

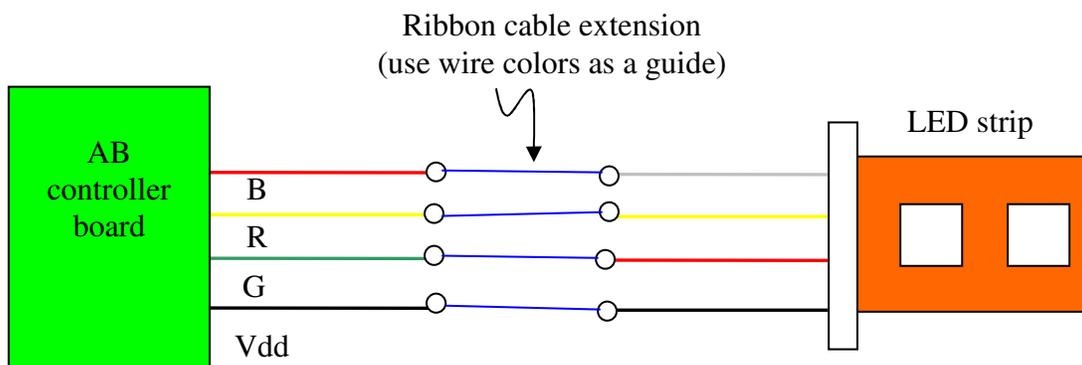
From the LED ring side, connect up the wires to the ribbon cable. Soldering the wires is the best way to do this. You can use heat shrink or electrical tape to protect the connections.



From the AB controller board, connect the wiring harness to the other side of the ribbon cable, making sure that you connect up the wires correctly. Follow the below diagram, the ribbon cable colors will let you easily make sure the end wires connect up to the correct locations.



For completeness, here is a diagram showing the mapping of the wire colors:



Wire connections between AB ring and controller

MOUNTING THE LED RING

Now you are ready to install the ring on your plane. You can bend the ring assembly to match the shape of your tube. Your AB ring is made from flexible material. It can be formed into circles, ovals, or other shapes that do not need sharp bends. The strip material will have light adhesive on one side that you can use.

TURBINE INSTALL: Mounting of the strip depends on how close the strip resides to your pipe. If temps are reasonable (under 120F) you can use hot melt glue. Otherwise consider using hi-temp glue, epoxy, CA, or other. You can also use Kapton tape to secure the ring.

NOTE: Do not let any part of the LED strip touch the exhaust pipe. Wrap the 4-pin cable going back to the controller board with aluminum foil and Kapton tape, metalized tape, or some other heat-reducing material.

EDF INSTALL: You can easily mount the strip to your tailcone(s) using hot melt glue or the included adhesive strip.

Here is an example of a strip tacked down in a yellow 1/8 scale F-16 tailcone.



NOTE: There are many different ways to mount the LED strip! As long as the strip components do not short out on metal or the pipe feel free to mount it any way you see fit.

Lastly, run the ribbon cable all the way back to the controller board and plug the 4-pin keyed connector to the controller board.

TURBINE INSTALL Make sure the ribbon cable doesn't directly contact your exhaust pipe. You can use Kapton tape to secure the cable to the inside of the fuselage from the back up to the turbine.

EDF INSTALL Run the cables outside of your thrust tube if you have one. If not lay the ribbon cable flat and tape it in place.

MULTIPLE EXHAUST INSTALLATION

If you are using the controller board with a dual exhaust plane, you can use one controller board and two LED AB strips. All you have to do differently is splice both LED strips to the ribbon cable extension before going back to the controller board.

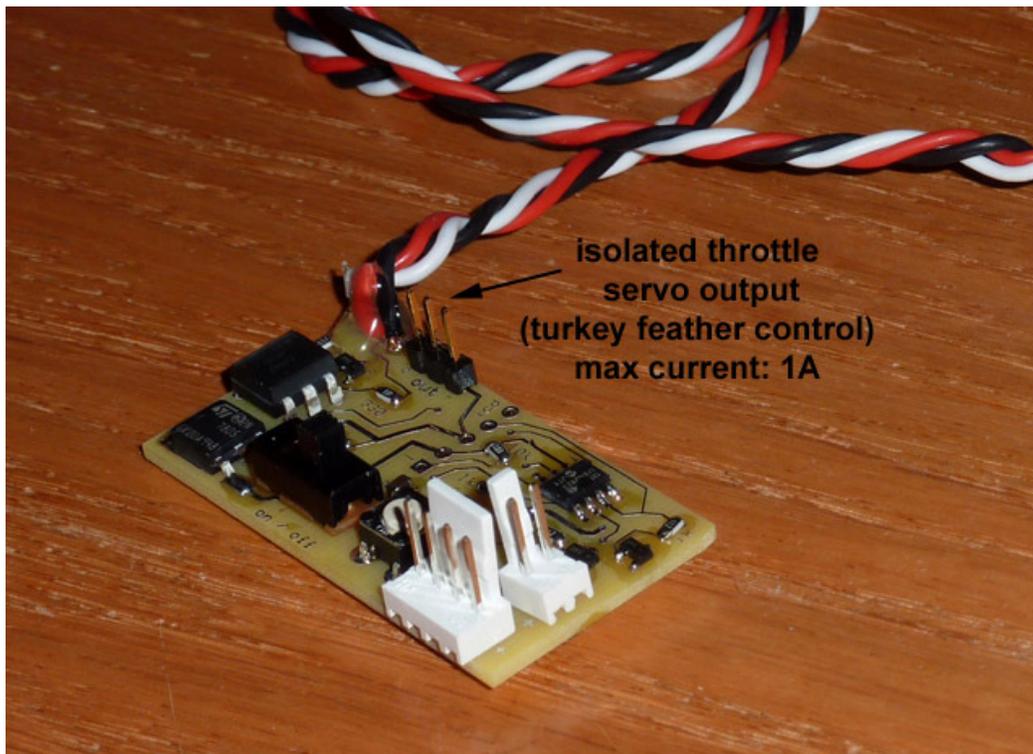
The controller board will handle driving both strips. Current draw will double to approx 1.2A. Make sure your battery pack can supply this much current.

NOTE: If you are using a flicker mode, both engine cones will flicker the same. If you want individual flicker effects for each engine you can use 2 separate controller boards.

OPTIONAL THROTTLE SERVO OUTPUT

The board also has an electrically-isolated throttle signal servo output header. This signal is isolated from the original receiver circuit and the ECU. This provides protection in case an electrical failure happens, neither the ECU or Rx are effected. You can also use the servo output to drive a servo motor that moves with throttle. This can be useful for a mechanical turkey feather tailcone that would open with increasing throttle.

NOTE: The max current draw is 1A for the onboard voltage regulator. If you have a high-drain servo, exceeding this limit may damage the onboard regulator!



OPERATING THE AFTERBURNER KIT

Using the kit after installation is straight forward. As a test, put a battery in your plane and power up your Tx and Rx. Power on the afterburner board using the onboard on/off switch

NOTE: Don't forget to turn the AB controller board off after you are done flying. Otherwise it will drain your battery very slowly.

Move your throttle stick low to high. The AB ring should respond by changing color and becoming brighter as the throttle position increases!

If you hold the programming button on the controller board for more than 10 secs, the AB strip will light up each color – red, green, blue, white in sequence as a test. If this is successful you have the board connected properly.

All features of the board are accessed using the programming pushbutton. Basically each feature is cycled through by holding the programming button down for a set period of time and then releasing it. The board will respond with a distinct color and blink sequence so the user gets feedback from their input. Cycling to a desired setting involves repeating the hold-release method multiple times to get to the value you wish. **NOTE:** As you press the programming button the ring will illuminate green to let you know it is active.

Method for accessing board parameters are listed below w/ detailed descriptions:

Setting	Hold button down for	Board responds with...	Value range	Default value
Set the throttle "on" position for AB effect	Less than 0.5 sec	3 red blinks followed by 1 blink when position saved	1ms - 2ms	1ms
Set color profile for AB effect	1 sec	Blue blinks xx number of times (xx is current profile)	1 – 3 1=red to purple/white 2=orange to yellow 3=orange to white	1
Set the battery type used to power LED strip	2 sec	Yellow blinks xx number of times (xx is number of cells selected)	3s lipo – 8s lipo	8s lipo
Select the AB flicker effect	3 sec	Purple blinks xx number of times (xx is current effect value)	1 – 3 1=standard 2=slight flicker 3=flicker + flash	1
Reset board to all default values	4 sec	1 green blink		
Test sequence/reboot	10 sec	Red, green, blue, white sequence – plus reboots board		

Table 1. – Changing board settings

Setting the on position:

ACTION: Pressing the prog button quickly and releasing it sets the throttle on position for the AB effect.

The throttle on position defaults to 1ms (low throttle).

RESPONSE: The board will respond by blinking the LED strip in red 3x. At this point put the throttle stick where you want the AB effect to turn on. After the board is done sampling the throttle position, it will blink 1x red to confirm.

Now you can check to see that the AB effect activates when your stick surpasses this threshold.

NOTE: For turbine users, you can set the throttle trim to high and the stick low and program in this value. This will set the AB effect to turn on right above the minimum throttle position when in normal operation.

Setting the AB color profile:

ACTION: Holding the prog button for 1 sec cycles to the next color profile for the AB effect.

The default color profile (setting 1) starts at red, moves to orange, is yellow at half throttle, moves to white, then finally to purple white at full throttle.

Setting 2 starts at red-orange, moves to orange, then yellow, to bright yellow at full AB.

Setting 3 starts at red-orange, moves to yellow, then white at full AB.

RESPONSE: The board responds by blinking the LED ring blue with the current setting number.

Setting the battery type:

ACTION: Holding the prog button for 2 sec cycles to the next battery type.

NOTE: Battery voltages for the LED AB ring can be 3s lipo (11.1V) up to 8s lipo (30V).

The default battery type is set at 8s (30V) lipo pack. This is done so a user can power on the board the first time without damaging the LED strip with any size battery. Holding the programming button for 2 sec and releasing will cycle through the battery settings. If you want to select a 4s battery, you will have to hold the button once for 2 sec. The board responds with 3 yellow blinks (3s battery). Do this again one more time and the board responds with 4 yellow blinks (4s battery). You are done.

RESPONSE: The board responds by blinking the LED ring yellow with the current number of cells in the battery. (3s-8s)

Setting the AB flicker effect:

ACTION: Holding the prog button for 3 sec cycles to the next flicker effect.

The default (setting 1) has little to no flickering in the AB effect.

Setting 2 has slight flickering enabled with low-level random flashes.

Setting 3 has more flickering with high-level random flashes.

NOTE: With setting 2-3, the LED ring might flicker with the throttle "on" setting in the lowest position. To rectify this program the throttle on position to be 1-2 clicks from the lowest throttle stick position.

RESPONSE: The board responds by blinking the LED ring purple with the current setting number.

Reset all parameters to default:

ACTION: Holding the prog button for 4 sec cycles resets all parameter to default values.

RESPONSE: The board responds by blinking the LED ring green 1x.

Test sequence/reboot CPU:

ACTION: Holding the prog button for 10+ sec plays out a test sequence and reboot the microprocessor.

RESPONSE: The board responds by blinking the LED ring red, green, blue, then white.

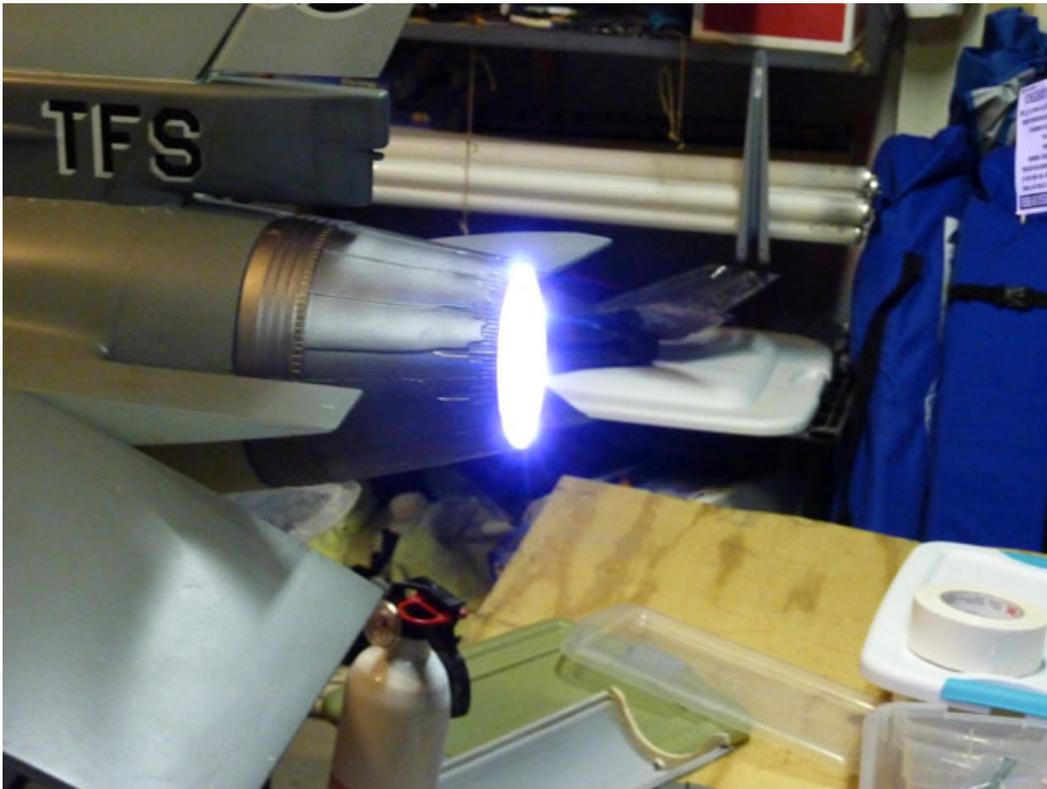
BOARD SPECIFICATIONS

Dimensions: 1.9" x 1"

Current draw: 700mA typical (max 3A)

Battery voltage: 11V - 30V DC (regulated 5V onboard)

Signal isolation: opto coupled from ECU/throttle signal



Fly your plane and have fun!!! Please be safe.

If you have any problems, please contact shima@hyperdynelabs.com

NOTICE: There is no warranty on kits!! It is your responsibility to install the board. Kits cannot be returned! Be careful if you plan to use a battery source that is capable of delivering a lot of current. Contact a professional if you need assistance. Hyperdyne Labs assumes no responsibility for the misuse of this kit.

