

Joint Newsletter – November 2022



AMA Chapter #4555



AMA # 2475
Silver Leader Club

Upcoming:

Saturday December 3rd Club meeting 11AM at the field

-Officer Elections

-Lunch will be served

-1st Annual Chili Bowl Fly-in. Bring your best pot of chili (we will have electricity)

Editor Comments

Hello Everyone, Thanksgiving is upon us. We have much to be thankful for. We still live in the greatest country on earth despite what the media would like to tell you. We can still fly model airplanes despite the fear mongering over remote ID. Fly at the field, you don't need remote ID, our hobby is well grounded. No worries.

Most importantly, we have a great place to fly, and the landowner is happy with the direction.

I think we are all happy that we have a field that is not underwater or too muddy to fly at half the year.

Many, many things to be thankful for this year. We have a great club and a fantastic bunch of members. To all who have helped things get situated this year. Thank you.

I would also like to recognize our Veterans in the Club and give a big thank you for your service to our country on this Veteran's Day.

Officer Elections December 3rd at the field 11 AM

Officer nominations are completed. Nominations as follows:

President- Jeff Holland

Vice President – Richard LeClaire

Secretary- Duane Knight, Michael Viscosi

Treasurer- Keith Schevling

Field Safety- Paul Napier

Election will be held by ballot at the field, results will be counted and announced at the meeting. Want to vote? you must be at the meeting. Participate! this ain't that mail-in vote crap that goes on in California.

1st Annual Chili Bowl Fly-in December 3rd

Chili and flying. Sounds like good times to me.

If you would like to participate, we are asking those who can cook a good bowl of chili to bring your best recipe! We will have running electricity at the meeting for crock pots. Let's have us some chili and enjoy some RC flying.

Generator Install Progress

The generator has been installed. The Field Improvement Team has completed the install of a generator system along with power distribution / outlets at the field. This system consists of the following:

- New 3500 watt inverter generator (with 2 year warranty) that offers clean, conditioned 120v AC Power for sensitive chargers / power supplies.
- Generator shelter with lock to house the generator that includes exhaust ducting and a cooling fan (runs with lid closed) which is ultra quiet.
- Circuit breaker box in the shed consisting of three 15 amp circuits : one in shed and two at awning.
- Underground power to the awning.
- Dual GFI protected "Quad" outlets under the awning in waterproof enclosures (2 circuits of 15 amps each).
- A RED light on the front of the shed signifies the system is "ON".

(See pictures next page)

Operating instructions, gas replenishment (we have a green container in the shed for you to chip in a few \$'s for gas if you utilize the system), and maintenance instructions / who to call if there are issues will be launched soon. **This is scheduled to be fully online before Thanksgiving. We will keep everyone updated.**

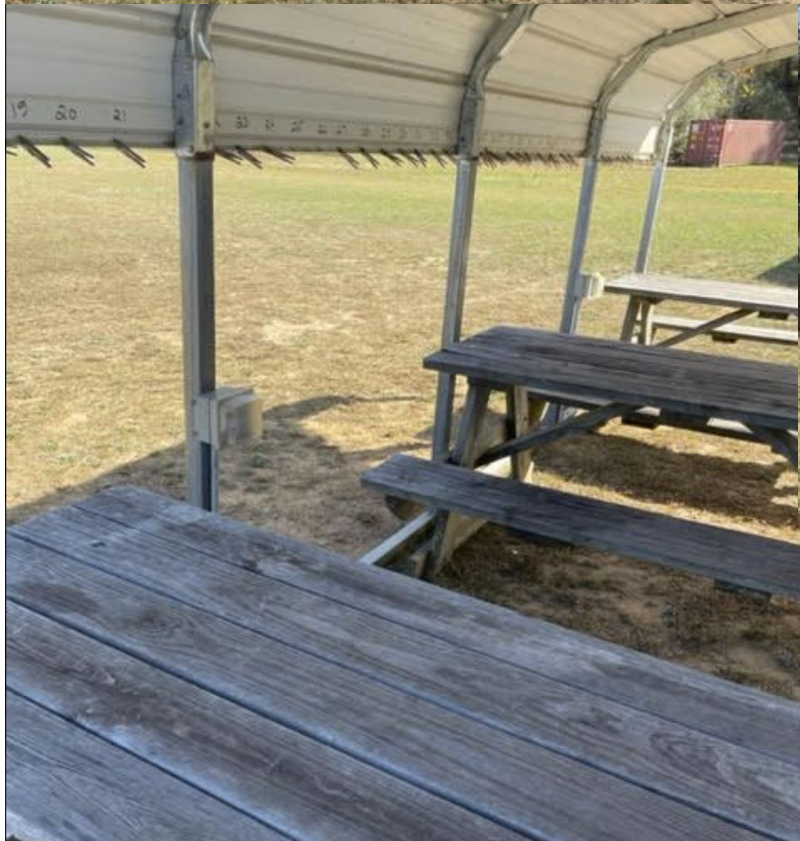
A big thank you to all who have helped make this project possible.

Jeff Holland – BCMA President

Generator Install at the Field



Canopy Move to up to flight tables



For those who may have not visited to the field all year, many improvements. We have a container now to protect our mowers from the elements. The Canopy has been moved up near the flight tables. Electrical outlets have been installed for charging with a 3500W generator powering.

Club Dues for Calendar Year 2023

The joint officers have developed a dues structure for 2023 that is a little different for next year. This new structure is one that gives you flexibility with your financial commitment based upon the amount of time and effort you can / will assist the club with. The new dues structure is as follows:

•**\$250 for the year** + your commitment to helping out with a minimum of **3 club activities / maintenance efforts at the field during 2023**. These activities could include any of the following (each count as 1 "activity"):

- General Club workday
- Cutting grass once per quarter - Grounds maintenance crew can get you scheduled -See Richard LeClaire
- Weed eating once per quarter - Grounds maintenance crew can get you scheduled -See Richard LeClaire
- Helping out at a field improvement project
- Cooking lunch at club meeting / event
- Bringing food / preparing food at a club meeting / event
- Maintaining equipment at the field
- Participating in the club instructor pilot program - See Jeff Holland
- Maintaining club training aircraft
- Attending a quarterly club meeting
- Participating in a club fund raising activity
- Recruiting a new member to join the club

•**\$300 for the year** if you can't help our due to work commitments, time commitments, physical constraints, etc. - This will be on the honor system so if you sign up for the lower, \$250 rate, we are trusting that you will honor your commitment and VOLUNTEER!. If you sign up for the higher, \$300 rate, it's understood that you will not be asked / expected to participate in club maintenance activities. If the lower, \$250 rate is abused, we will have to look at remediation for next year.

NOTE: We must pay our landlord on January 1st so ALL Dues must be **received no later than December 15th**.


Dues are now open for payment and can be paid by the following methods:

•**Paypal** direct link for either the \$250 or \$300 amount (plus fees) on the club website, www.bcmarc.com (website auto calculates the Paypal fees for you . Totals will be \$258 for the committed fee or \$309.50 for the non-committed fee. The club can't absorb the fees as lean as we run on administration costs).

•**Check** made out to "BCMA" for either \$250 or \$300 and sent to Keith Schevling, Treasurer at:
Bartow County Model Aviation, Inc.
Attention: Keith Schevling
221 Windy Ridge Lane
Canton Ga 30114


Kindly remit your dues asap so we can plan out the budget for 2023 asap and keep the field improvements coming for a better flying experience.

Jeff Holland – BCMA President



 CARTERSVILLE GA
 AMA Charter Club #2475
 est. June 16, 1988
 AMA District V NEWS


and
 Northwest Georgia RC



 Bartow County Model Aviation
 Charter #2475

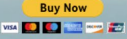
HOME Training Gallery Weather Club Information Contact us Calendar

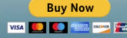
Club News
RENEW YOUR MEMBERSHIP FOR 2023
 2023 Club Dues and Access to the New Online Application
 Click to Go to 2023 Field and Safety Rules
 Message from District V



Next Club Meeting
 Club Officer Elections will be held *"in person"* during this meeting at Kingston Downs Field

Go to BCMARC.COM and click renew your membership for 2023

Renewing Membership
 PayPal is charging 2.99% plus \$0.49 per transaction.
 Therefore, with a "Club Volunteer Commitment"
 Total Payment - \$258.00


 PayPal is charging 2.99% plus \$0.49 per transaction.
 Therefore, without "Committing to Volunteer"
 Total Payment - \$309.50


If you would rather pay by check
 Make the check out to BCMA and mail it to:
 Bartow County Model Aviation, Inc
 c/o Keith B. Schevling
 221 Windy Ridge Way
 Canton, GA 30114

Here you have your choice via paypal or you can just mail Keith a check to the address listed.

For Sale:



Futaba 14SG transmitter and R7008SB receiver.

Nearly new excellent condition. I got it several years ago when I bought a quad copter from someone.

PRICE: \$200.00 or reasonable offer.

I can bring to Kingston Downs field if there is any interest.

James Grebe: jgrebe@cioblueprint.com
972-261-4377

CARF 104" Extra with 3W106 TOC motor and 3W Canisters



More pictures on request or I can bring to Kingston Downs.

Motor pulls strong and all servos work
The plane is not going to win any beauty contests, but it might be a good option for someone looking to get into large scale gas planes

Includes: Velocity stack, Carbon fiber 28x10 prop and carbon fiber spinner. Smart-Fly Competition 12 Turbo Plus with fan-cooled regulator, Spektrum AR12020 receiver with two satellites. Fiber optic ignition kill. Hitec high torque digital servos (HS-5645MG) with titanium pushrods on all surfaces (pull-pull cables on rudder), SWB dual servo self-centering rudder tray, White Rose Engineering carbon fiber and CNC aluminum tail wheel assembly upgraded to the milled wheel/urethane tire option. Mylar wing bags.

Priced to sell so I can make room for other projects.

Price: \$1,000 firm

James Grebe: jgrebe@cioblueprint.com
972-261-4377

OS FS-40

.40 Four Stroke

New, Never Ran.

Includes Box, documents, and original tools included.

(this is not the newer surpass)

\$120

Ron Adams

roneadams2@gmail.com

Linear BEC vs Switching BEC

By Lucien Miller

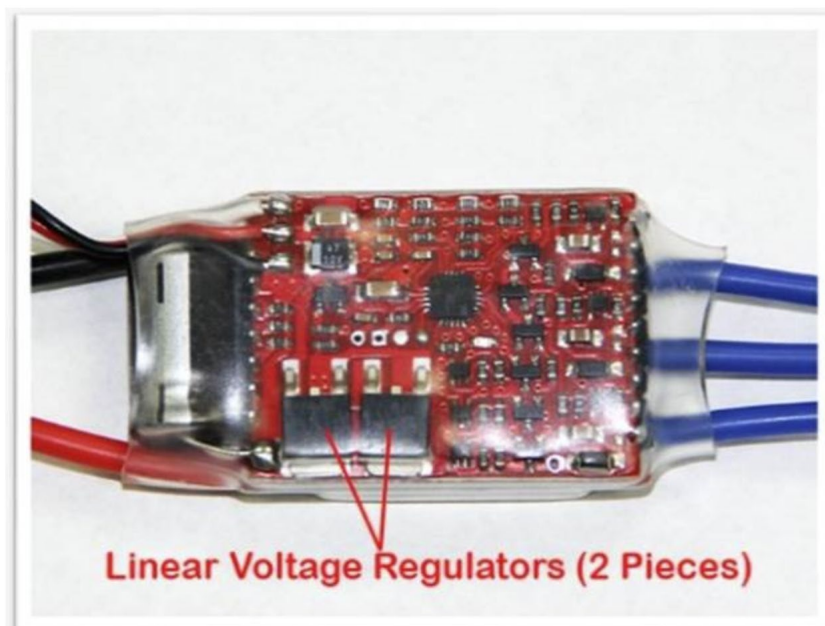
Quite often in emails from customers I get asked the question, “What is the difference between a Linear BEC and a Switching BEC?” These are actually a pretty good questions, and knowing the difference between the two can really help in selecting the right speed controller for a model.

Well, the simple answer is that a Linear BEC throws away excess voltage by converting it to heat, while a Switching BEC does it by turning on and off really fast as needed to pass through the required voltage. Unfortunately, that does not tell you very much! Since I like to pass on educational information to fellow hobbyists whenever possible, the complete answer to this question is explained below.

In all BEC's, the object is to step down the voltage level of the motor battery to a lower value, typically between 5 and 6 volts, so you can power the radio receiver and servos directly from the motor battery. This eliminates the need to carry a separate 4-cell or 5-cell, Ni-Cad or Ni-MH, battery pack in the plane to run the receiver and servos. This is where the BEC gets its name, since BEC stands for “Battery Eliminator Circuit”. The BEC eliminates the need to have a separate battery on board to power the Receiver and Servos.

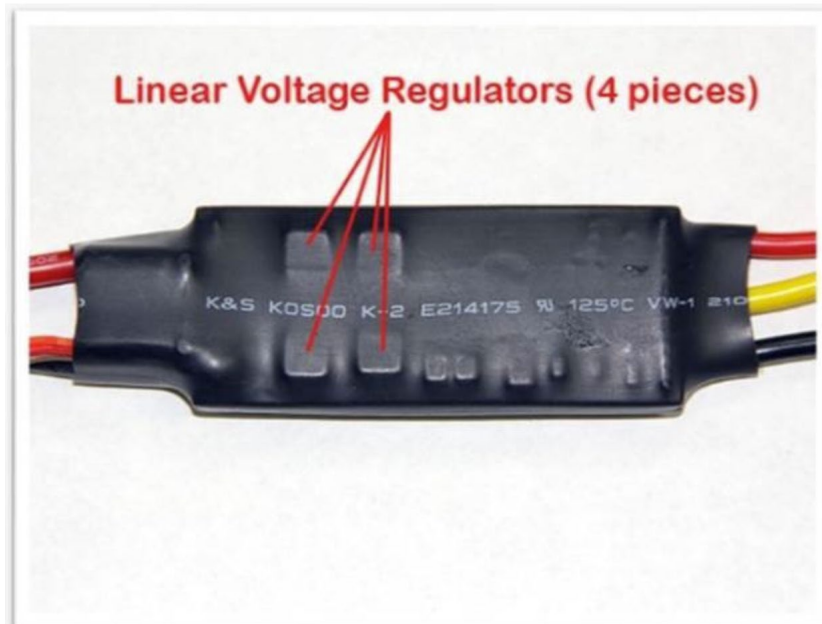
The batteries used to power RC aircraft are normally Li-Po type, and can be anywhere from 2 cells (7.4 volts) up to 12 cells (44.4 volts). The receiver and servos are typically designed to be operated from 5 to 6 volts, so the battery voltage from the motor needs to be dropped down to a lower level, so it can safely be used to power the receiver and servos. There are two different ways to drop down the voltage level from the battery pack to the correct level, Linear BEC circuits and Switching BEC circuits.

Linear BEC circuits simply use voltage regulator IC's to step the voltage down to a safe level. The photo below shows the back side of a speed controller showing the location of the voltage regulator IC's on the circuit board. These parts are normally about 3/8” or 10mm square. These devices typically drop the battery voltage down to 5.0 volts, and dissipate the excess voltage out as heat into the part, and into the surrounding PC board that they are attached to.



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This next photo shows how the Linear BEC chips look on an ESC that has a black heat-shrink cover, so you know what to look for.



The benefit of Linear BEC circuits is that they are cheap, and require no other additional components to work properly. Everything is contained within the part itself. The downside is that they are limited to use on smaller batteries, such as 2-cell and 3-cell Li-Po packs, because of the amount of heat that they generate. In most cases, each voltage regulator chip can handle 1 amp of current, so a 2-amp BEC will have 2 of these IC chips working together, as seen on the ESC with the clear heat shrink above, and a speed controller with a 4-amp BEC will have 4 of these IC's working together, as seen in the speed controller above with the black heat shrink cover.

The amount of heat generated by the IC's is dependent on the amount of current that the BEC circuit produces, multiplied by the voltage drop of the part. When running one of these parts on a 2-cell Li-Po battery, the battery voltage starts at 8.4 volts when the battery is fully charged, and drains down to about 7.2 volts at the end of the charge, so the average voltage is around 8 volts. If you drop 8 volts from the battery down to 5 volts for the servos, the drop is 3 volts. If the BEC puts out the full rated current of 1 amp, then the IC chip must dissipate 3 volts x 1 amp or 3 watts of power. In a 2-amp BEC, each IC would carry 1 amp, so the total heat output would be double or 6 watts of heat energy.

When you step up to a 3-cell battery, now average voltage of the pack is closer to 12 volts. This means that when you step 12 volts down to 5 volts, you have 7 volts left over. At the full current of 1 amp, each IC chip would need to get rid of 7 watts of heat energy. Unfortunately, the D2PAK type of case that these IC chips normally come packed in, can only safely dissipate about 4 watts of power without overheating. In this case, running the BEC at full power of 7 watts per chip would overheat the BEC. This is why Linear BEC circuits are only good for their full rating when run from a 2-cell battery pack. If you run them from a 3-cell battery pack, you have to "De-Rate" the output of them to only 50% of the rated value. This means that an ESC that has a 3-amp BEC can only put out the full 3 amps on a 2-cell battery. On a 3-cell battery you can only expect to get 1.5 amps from it without overheating.

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If you do go up to a 4-cell battery pack, then the battery voltage goes up to 16 volts, and you have to get rid of 11 volts to get down to 5 volts for the receiver and servos. This limits the maximum current to about 1/4th of actual rating, which is typically not enough to drive even 1 servo. This is why most ESC manufacturers recommend not using the internal BEC, and using an external BEC circuit for this type of ESC when it is run on 4 Li-Po cells.

To “disable” the on-board BEC, there are a couple of options. The most common way is to lift up on the little tab that holds the contacts into the black connector shell, and slide the contact for the red wire out of the connector. This is then folded over and covered with electrical tape or a piece of heat shrink to keep the bare contact from touching anything. This prevents the voltage from the BEC to go out and power the receiver when the ESC is plugged into the throttle channel. Some people will actually cut out a small piece of the red wire to disable the BEC. I do not recommend this, because it is not easily reversible if you want to use the BEC later on in a different application.

Another easy way of disabling the BEC is to install a short 4" servo extension onto the control lead of the ESC, that has had the red wire cut out. This makes it easy to unplug the extension later and keep the BEC intact in the speed controller.

In short, the Linear type BEC is cheap, and works well for low voltage 2-cell and 3-cell operation. Unfortunately, they are not very efficient. When run on 2 cells, the efficiency is only 62% and when run on 3 cells it is only 42%. This is because all of the extra voltage is simply converted to waste heat and not used. In fact, in many cases, the BEC circuit actually heats up the ESC more than the transistors do when controlling the motor speed!

The other common type of BEC is the Switching BEC. This type uses a small FET transistor to switch the voltage from the battery pack on and off very quickly, around 150,000 times per second, and then filter this output through an inductor and capacitor to smooth out the ripple to produce a steady DC voltage. By varying how long the transistor stays turned on during each switching cycle, the device controls itself to maintain a constant voltage, regardless of the load.

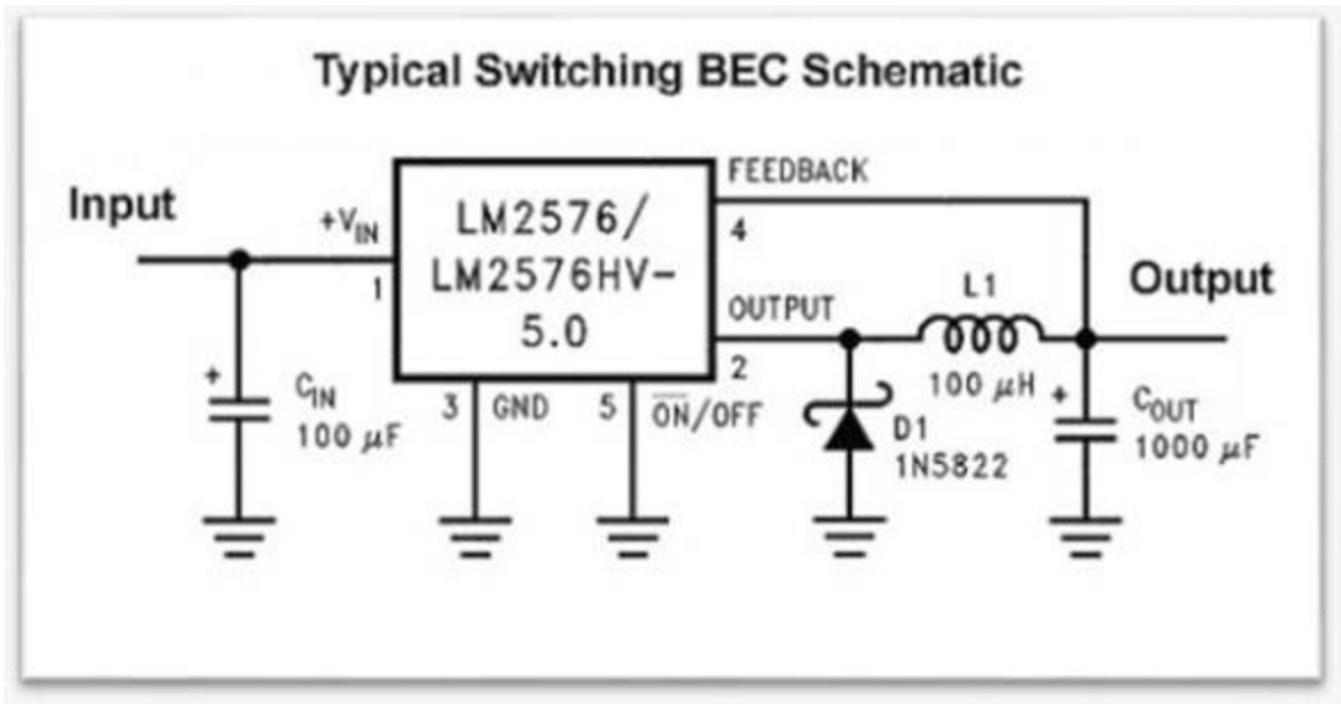
In the case of a 3-cell battery, you need to step the voltage down from 12 to 5. An output of 5 volts is 42% of the 12 volts, so if the transistor turns on for 42% of each cycle, and off for 58% of each cycle, and this amount of voltage is averaged out and filtered, you end up with 5 volts DC.

In the case of a 4-cell battery, to go from 16 volts to 5 volts, the output needs to be on for 31% of the time and off for 69% of the time and you still get 5 volts out. As the input voltage increases, the duty cycle simply reduces so that you always have 5 volts out.

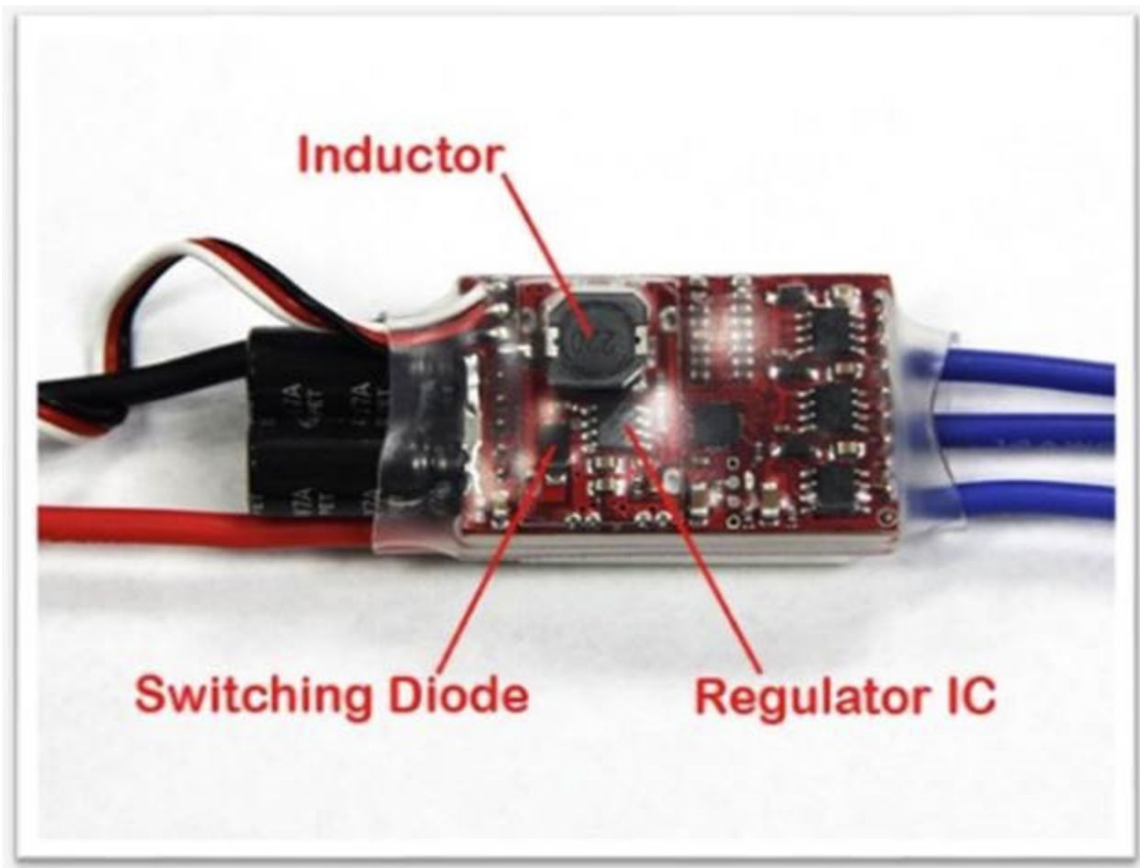
The beauty of this type of BEC is that there is no waste heat energy generated to speak of. Instead of throwing away the excess voltage as waste heat, as is the case with a Linear type BEC, the Switching type BEC simply turns off when it gets enough power for each cycle. There is a small amount of heat lost in the switching transistor, the controller IC and the Inductor in the circuit, but this is typically only 4 to 6% of the total amount of energy. Because of this, the overall efficiency of a Switching type BEC is around 95%, regardless of the input voltage.

The down side to a Switching type BEC is that it has more parts, is more complex, and costs more to implement. Below is a schematic diagram of a typical BEC circuit as used in an R/C ESC. There is a small IC chip that is normally in a 5 to 6 pin package that contains the switching transistor and the control circuitry. In addition to this part you typically have an input capacitor, and output capacitor (often called a Charge Capacitor), an inductor and a diode.

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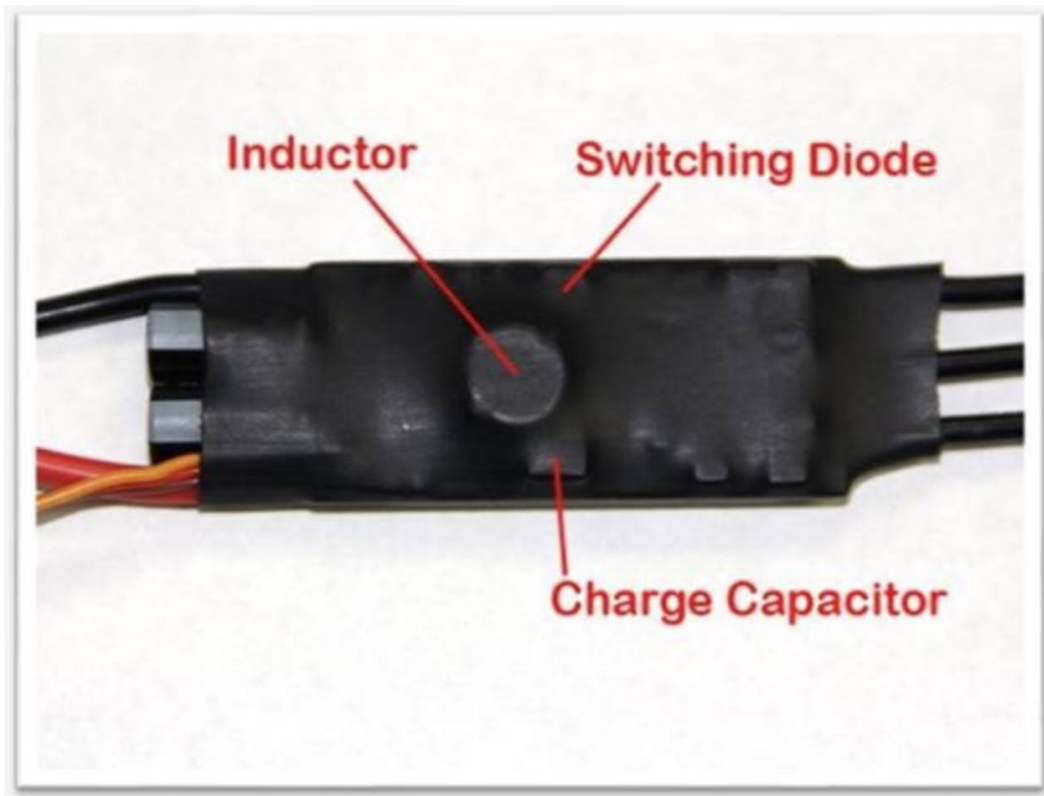


On an actual speed controller, these parts look like the one shown in the photo below. Three of the main parts are labeled, the Inductor, the Diode and the IC chip. The output capacitor can just barely be seen behind the inductor, and the input capacitor is the small part just below the IC chip.



Continued....

On a speed controller with black heat shrink, the switching type ESC can be identified by the large inductor, with is about $\frac{1}{2}$ " or 12mm square, as seen in the next photo.



The nice thing about the Switching BEC is that it puts or full current, regardless of the input voltage. This is much better than the Linear type BEC, which must be de-rated or disabled as the voltage goes up. If you have a Switching BEC that is rated for 5 amps, it will deliver the full 5 amps whether you run it on a 3-cell, 4-cell 5-cell or even a 6-cell battery.

So now you REALLY know the difference between a Linear BEC and a Switching BEC.

Reminders

Have an article you want share? Send it in.

Something you want sell? send it in.

Have a new plane? want to share pictures? Send it, tell us what you think about it.

Send me your stuff: roneadams2@gmail.com

Get your Trust # and FAA # to Keith Schevling :
keithschevling@gmail.com

If the club doesn't have a record of your Trust # and FAA# you are going to lose flying privileges. Get it done folks.

See you at the Field.