Salmon and Electric Fields
Part 3 Rigging Your Boat For a Black Box

First, some caveats. As I mentioned in the previous article Daniel Nomura showed that using a black box can approximately double the number of chinook salmon that you catch, however this is only one factor among many. If there are no salmon in the area that you are fishing, or if your gear is running at the wrong depth or the salmon do not like your offering, using a black box won't help. You need to be "in the zone" for the black box to do any good.

Also running a black box requires using stainless steel downrigger lines which conduct electricity. Braided downrigger lines, the alternative to stainless steel, have many advantages. They are smaller in diameter and provide less drag than the stainless steel lines they replace. If I were fishing during the winter months and routinely running my gear at depths of 120 to 200 feet I would probably use braided line, it's a lot easier and just makes good sense.

During the summer months the adult salmon migrating to their natal rivers often travel at depths of 30 to 60 feet. When I guided on the central coast the vast majority of my fishing was in this range. More recently I've been fishing in the Vancouver area at the mouth of the Fraser River at similar depths -- I rarely fish below 100 ft. For this type of fishing the stainless steel downrigger line works fine and also allows me to use a black box. Stainless steel line kinks easily and is more difficult to handle than braided line but I accept these challenges because I believe I catch more salmon with stainless steel.

If your downriggers are presently spooled with braided line which does not conduct electricity and your downrigger balls are coated with vinyl, then your terminal gear will be running at a natural voltage of ground (0.0 volts) relative to the boat. This can be improved by changing to stainless steel downrigger line and using a black box to set the voltage to 0.6 volts, which is the recommended voltage for chinook salmon.

And if your boat hull is welded aluminum, or if it is fiberglass and you are lucky, you may not need a black box – just running stainless steel downrigger lines might put your natural voltage into a favourable range and improve your fishing considerably, compared with using braided line.

The first step is to either spool a downrigger with stainless steel line or borrow one from a friend. Use a stainless steel coastlock snap hook at the end of the cable (Scotty downrigger terminal kit 1153) and attach it to a downrigger ball. Take the boat some distance from the dock to avoid spurious electrical currents at the marina, drop the ball down to fishing depth and with the motor and all of your electronics running measure the voltage between vessel ground and the stainless steel downrigger line. You will need a voltmeter which can accurately measure a DC voltage of less than one volt. Place the voltmeter ground lead on the battery ground post (the motor chassis or the hull of a welded aluminum boat also work) and touch the voltmeter "V" lead to the stainless steel downrigger cable.

If the measured voltage is between 0.5 volts and 0.7 volts it's already in a favourable range for chinook salmon and you probably don't need a black box. If it's positive but outside of this range the black box

will help. If it's negative or way outside of this range you may have a short between an electrical device on the boat and a metal through-hull fitting, or a problem with your zinc anodes.

Note that a stainless steel downrigger line connected to a bare metal lead downrigger ball will usually have a voltage of about 0.5 volts relative to vessel ground. Vinyl coating the ball should move this voltage closer to 0.8 volts. The natural voltage of the boat can be adjusted without the use of a black box.

To rig the boat for use with a black box you will need to spool the downriggers with stainless steel line, buy and install a black box, and run the wires from the black box to the downriggers.

Spooling the downriggers with stainless steel line is relatively easy. Be sure to use a stainless steel thimble and stainless steel coastlock snap hook at the end of the cable and a bare metal downrigger ball. It is important that the downrigger ball be connected electrically to the cable and the black box, with no insulators in between. The bare metal surface of the downrigger ball will provide a large surface area to radiate the electric field and attract the salmon.

Pro-Troll Black Box

I bought my black box online from Pro-Troll, which is located in Concord, California. It works well and was easy to install. It is powered by the boat electrical system and its positive lead is connected to the stainless steel downrigger line with a stainless steel coupling as shown in the photo below.

Black Box Downrigger Line Connection

I've used the Pro-Troll Black Box for several seasons and found it to be quite reliable. With the toggle switch in the "up" position the black box works as a voltmeter and measures the natural voltage of the terminal gear. My gear typically measures near 0.48 volts. With the toggle switch in the "down" position the black box generates an electric current to the downrigger cable. The rotary knob adjusts this current. The value shown on the display is the voltage measured at the black box – note that depending upon the resistance in the downrigger cable this may not be the actual voltage at the cannonball. When fishing deep it may be necessary to increase the voltage at the black box slightly to compensate for cable losses.

The recommended voltage varies by salmon species, and is shown in the table below.

voltage	salmon
0.60	chinook
0.65	coho
0.75	sockeye

A few considerations when running a black box:

1. The larger the radiating surface the wider the range of the electric field, which is why downrigger balls should be bare metal. Don't use a plastic swivel hook, which would insulate the cannonball from the downrigger cable.
2. The electric field is strongest near the downrigger ball and downrigger line. Attach the release clip close to the downrigger ball and set the gear as close to the release clip as possible (but give the flashers enough distance to work properly).
3. Running more downriggers on the black box increases the electric field around the boat and draws the salmon in from a greater distance.

I've found that the black box works particularly well in low visibility conditions, for example in the murky water at the mouth of the Fraser River, and strikes tend to be aggressive.

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