

Tech Talk - Electronics

Electronics, they are what makes the car work. Without a good electronics setup in your race car it is going to make for a very long, bad day.

Remember a few things when setting up the electronics in your race car. First keep it simple, keep it clean and finally use good high quality parts. Do you really want to trust a race car that you have invested time and money in to a \$1 switch or a bargain connector? Do not let a saving couple of dollars take that car you have worked hard on and slam it into the wall and destroy it.

While we are on the subject of switches, stay away from the cheap, open slide type switches. With all the fuel, oil, dirt and rubber that these cars kick up you need to use a high quality sealed switch. When mounting your switch, mount it in a manner that the most impacts will not turn the switch off. If you are mounting it so the action is left and right in the car, mount it so that you move the switch to the right to turn it on. If you are mounting it so the action is front to rear, mount it so you move the switch forward to turn it on. This is not always necessary, but an ounce of prevention is worth a pound of cure or in our case thirty pounds.

Since we are talking connections, look at your servo connections. The simpler you make this, the better this will be. Have as few connections as possible. Keep this in mind, for every extension or plug; you add to two more connections and two more things that can go wrong. I have seen some good intentions with very clever boxes and I have seen those boxes cause some very bad problems. What happens is all those connections start working loose from the vibration and will cause intermittent problems for you. What I suggest is to use one "Y" cable for the steering servos and plug that "Y" cable into the receiver. Also, mount the receiver in a position close enough that the throttle servo will not need an extension cable. Another good thing to do is to use small cable ties on the "Y" cable where the servos plug into it. This will prevent them from working loose.

Pick up some wire loom at your local auto parts store. This stuff is great for making a neat installation. Not only has that but the loom added another layer of protection for your servo wires.

Now take a look at the life blood of your electronics system. The battery. Is the shrink wrap coming off of it? Is there corrosion on the cells? Are the wires frayed? Is that connector loose fitting or hard to line up when plugging it up? If you answered "yes" to any of these questions, you are racing on borrowed time. It is only a matter of time before one or all of these things cause your car to do something you are not telling it to do. Use only silicone coated/high strand count wire to make the connections to the battery pack; I would suggest a minimum of 14ga. Inspect that connector. I have seen many a car loose control due to losing a bond in the battery connection. Some racers have even gone to the lengths of hard wiring in the battery pack and only having a connector for charging. That has its advantages and disadvantages. On the up side, there

is no connection to break down. On the down side and this is especially true if you are running the new LiFe or LiPo batteries, if you are not going to run your car for a while, you MUST be sure to keep the pack charged. If you do not and you leave it connected, the possibility exists that you will ruin a LiPo battery, and it can happen with the LiFe batteries as well. It can happen with the NiMh or NiCd batteries but they are easier to charge if they do loose all of their charge. Stay away from the cheap Molex or Tamiya connectors. The Deans plugs work well and hold up to some abuse but I have seen these go bad as well. NEVER and I mean NEVER pull the connectors apart by the wires. Always grab the connector halves and pull it apart or push it together. Should you grab your Deans plus and feel any heat, that connection is breaking down and it needs to be replaced as soon as possible. Also if you have to wiggle it to make the connection, DO NOT run the car. Swap out that connector. Remember to keep that receiver pack charged. Now that most of you are running NiMh or the new LiPo/LiFe packs, these do not build a memory like the old NiMh cells, so it fine to top them off throughout the day. I recommend you charge the night before going racing, leaving it unplugged from the car once it is fully charged and then depending on how much practicing you do before the qualifiers. Always charge your receiver pack before the main. This is another instance to be better safe than sorry.

The receiver pack in my car is a 3300maH NiMh pack and I will usually charge is at 2 amps. There is no need or advantage to pumping more current into the pack, we are not looking for the performance that the electric crowd does, so the lower charge rates are perfectly acceptable for our needs.

When charging the LiPo/LiFe packs it is EXTREMELY IMPORTANT to use the correct charger and charge rate. If you use a charger not designed for these cells you are asking for disaster. These cells charge in a completely different manner and will explode, swell or catch on fire if charged incorrectly. A charge rate of 1C is the recommended charge rate foe the LiFe/LiPo cells. This means that if you have a pack that is rated at 3300Mah than the maximum charge rate is 3.3 amps. If you are not going to be using your car for an extended period, you will need to put a storage charge into your pack. This is usually 40%; this will keep the cell from over-discharging and becoming unusable. NiMh batteries will self-discharge at a rate of approximately 1-2% every 24 hours, therefore it is very important to keep these cells charged properly and pay attention to how much goes into them.

By paying attention to how much it takes to top off your pack you can keep an eye on the health of your pack. If suddenly it is taking more and more to recharge your pack after the same amount of racing. That gives you an indication of something going wrong. You are running more, there is a bind on the mechanical side or you pack is starting to break down.

On to the brains of the operation, the receiver, It is very important to pick a mounting location that will allow the antenna to get a clear signal, be far away enough from the engine so as not to pick up interference. Pay attention to where you mount the receiver in a box, should you choose to use one, also when routing the antenna wire, do

not allow it to cross over itself. If the antenna wire does cross over itself, that is cutting down on the effective range of the antenna. Mount the receiver inside the box so the antenna gets out of the box with the least amount of antenna wire inside the box as possible. Be sure to mount the receiver securely so it does not take an undue amount of shock and get damaged. Remember to always run a resistor type spark plug. This cuts down on interference from the ignition system from the engine.

There is debate on whether or not a voltage regulator is necessary, personally I run one. I run the Futaba FASST system and with the voltage regulator in place so that I am sure that the FASST receiver does not get more than 6 volts. There are some Spektrum receivers that are capable of taking more than 6 volts, so read your instructions that come with your receiver to be sure what you have. Remember this, if you are running any pack that is over 8 volts, such as a 3cell LiPo/LiFe pack you MUST run a voltage regulator. Putting that kind of voltage into your receiver is going to damage it.

I talked with Sonny Brown who is the Surface Team Manager for Spektrum. I asked him some things about the Spektrum systems. The information should prove useful for those of you running that type of system so here is that information. Below is the information Sonny shared.

T.D.S. Will the Spektrum system accept more than a 6volt input and do you need a regulator?

S.B. All Spektrum Receiver will accept up to 9.6v of input. This allows racers to choose from standard 5-6cell NiMh packs or 2S Lipo batteries if they have compatible servos. Personally I use a 2S Lipo Receiver pack and our new SPMSS6100 High Voltage, High Torque servos. I'm really happy with the performance and when compared to other HV offerings they are very affordable.

T.D.S. Is there a recommended receiver for Quarter Scale?

S.B. All Spektrum surface receivers may be used for Quarter Scale racing. For maximum performance I would recommend the use of the SPMSR3100 or SPMSR3520 (micro) DSM2 receivers. DSM2 is an updated version of our DSM technology and allows for a faster and more precise feel on-track.

T.D.S. Is the Spektrum module for the Futaba 3pk discontinued?

S.B. As of right now the 3PK system has not been discontinued. However, we are currently out of stock.

T.D.S. What are the most common problems you see when it comes to the receivers?

S.B. The most common issues that I see are improper receiver installation. When using a Spektrum receiver it is important that the antenna is fully extended and the

tip is at the highest point. The reason for this is that 2.4 antennas are still a tuned length and when they are folded over, coiled tightly, or packed inside of a receiver box you can lose range or reception. It's perfectly fine for the antenna to be under the body. One other tip is to not mount the receiver directly to the metal chassis or have the antenna touching a metal bar. This can also cause some interference issues. A radio box with the antenna coming out the top and isolated a few inches away from the chassis is best.

Thanks Sonny for the information!

Something that can cause problems for your car that is not electrical, but it is directly tied to the electrical system. Linkages, both the throttle and steering linkages must be free through their entire range of movement. If they are not, you can burn up a servo or even break the gears inside the servos. Check your throttle cable and brake linkage to be sure these do not bind and cause the servos to work harder than they have to. Be sure to set your endpoints (EPA) on your radio so that the servos do not over travel. If they do, this will cause undue stress on the gears and can also cause the control board inside the servo to burn up by having too much of a strain on it by attempting to push through a mechanical limitation.

Just remember the shortest wires possible, the fewest connections, good connectors and switches and free linkages. Doing these things should help you have a worry and trouble free day with your race car, at least as far as the electronics side of it is concerned.

It is really not as complicated as all of this seems to make it. In using these tips in your racecar I hope that it makes your racing easier and lets you concentrate on the other aspects of racing like smiling for your picture in Victory Lane.

Article by: Scott Harper