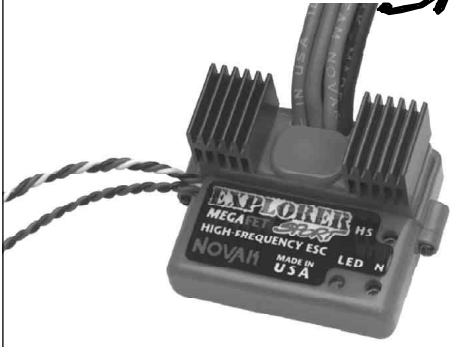


## OPERATING INSTRUCTIONS

# EXPLORER SPORT

PART #1900



## INTRODUCING THE EXPLORER

The Novak Explorer Sport ventures to bring race winning high frequency design to the economical price range of the sport level ESC (Electronic Speed Control). Equipped with Novak's revolutionary Polar Drive Technology™ the Explorer runs faster and longer than conventional speed controls. The Polar Drive circuitry provides smooth throttle response and improved radio system performance. The Explorer also has built-in brake light circuitry to power two external LEDs for added realism with Formula One and touring cars. (Two high power brake LEDs and versatile mounting hardware are available in Novak kit #5655)

Novak's Solid State RVP™ provides rugged protection against reverse voltage application without the need for fuses, while the built-in BEC (Battery Eliminator Circuit) powers the radio system with no external receiver battery.

Other features include the Novak Input Plug System™ for compatibility with all major radio systems, and purple anodized Micro Fin™ heat sinks. While factory installed JST/Tamiya style battery connectors and bullet style motor connectors make for quick and easy installation of the speed control into your car or truck.

## SPECIFICATIONS

Input Voltage	6-7 cells (1.2 volts DC/cell)	
Case Width	1.98 inches	[50.29 mm]
Case Depth	1.42 inches	[36.07 mm]
Case Height	0.70 inch	[17.78 mm]
Weight (w/o heat sinks)	1.87 ounces	[50.01 g]
On-Resistance @ Transistors	0.005	@ 25°C transistor junction temp.
Rated Current	150 amps	
Braking Current	50 amps	
BEC Voltage	5.0 volts DC	
BEC Current	0.5 amps	
Wire Size (Battery/Motor)	16 gauge	
Wire Length (Battery/Motor)	6 inches	[152 mm]
Signal Harness Length	6 inches	[152 mm]
Transistor Type	MEGAFET	
PWM Frequency	2500 hertz (nominal)	
Part Number	1900	
Brake Light Part Number	5655 (optional accessory kit)	

## EXPLORER ACCESSORIES

### BRAKE LIGHT KIT

The Explorer Sport speed control comes equipped with built in circuitry to power two high power brake light LEDs. Novak's optional Brake Light Kit (#5655) comes complete with two premium quality LEDs and versatile mounting brackets to mount the brake lights behind the taillight section of the car body or onto most any vertical or horizontal surface on the chassis.

### MOTOR CAPACITORS

To prevent radio interference problems, you must have three 0.1µF capacitors properly installed on every motor. Included with the Explorer Sport speed control are three 0.1µF (50V) capacitors for one motor. Additional 0.1µF (50V) capacitors are also available in Novak kit #5620. Please refer to Step 4 on the back page for proper motor capacitor installation instructions.

### COOLING FAN

An optional ESC Cooling Fan (kit #5645) is available for use with the Explorer ESC to provide extra cooling for heavy load applications with limited air circulation. If the ESC gets so hot that it goes into thermal protection mode, we recommend using the optional Cooling Fan.

## PRECAUTIONS

- READ INSTRUCTIONS CAREFULLY BEFORE USING!
- WATER & ELECTRONICS DON'T MIX! Do not operate model in or around water. Never allow water, moisture, or other foreign materials to get inside the ESC.
- 6 OR 7 CELLS ONLY Never use more than 7 or less than 6 sub-C cells (1.2 volt DC/cell) in the main battery pack.
- MOTOR CAPACITORS REQUIRED Three 0.1µF (50V) ceramic capacitors must be properly installed on every motor to prevent radio interference.
- DON'T LET TRANSISTOR TABS TOUCH Never allow the two transistor tab banks or the heat sinks to touch each other or any exposed metal, as this will create a short circuit and damage the speed control.
- DISCONNECT THE BATTERIES Always disconnect the battery pack from the speed control when not in use.
- TRANSMITTER ON FIRST Always turn on the power of your transmitter first so that you will have control of the radio equipment when you turn on the speed control.
- DON'T GET BURNT! Transistor tabs can get hot, so be careful not to touch them until they cool.
- INSULATE WIRES Always insulate exposed wiring with heat shrink tubing to prevent short circuits.

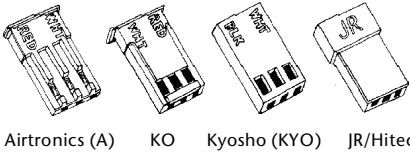
## RADIO INTERFERENCE

The high frequency switching operation of electronic speed controls can generate radio interference. Here are some common causes of radio interference problems:

- CAPACITORS NOT INSTALLED ON MOTOR Electric motors generate radio noise that can interfere with the receiver. To prevent radio problems, every motor must have three 0.1µF (50V) ceramic capacitors installed on it. Refer to Step 4 on back page for proper installation.
- RECEIVER/ANTENNA INCORRECTLY MOUNTED The receiver and antenna should be mounted as far from the motor, power wires, battery, and servo as possible, as these components all emit radio noise. On graphite or aluminum, place receiver on edge with the crystal and antenna as far above the chassis as possible. Mount the antenna close to receiver and trail any excess wire off the top of antenna. Do not cut or coil excess wire!
- MOTOR BRUSHES WORN As motor brushes continue to wear, excessive motor noise will be generated. To avoid radio interference, worn motor brushes should be replaced. The motor commutator may also need to be cleaned or trued and can be machined to help the motor run more efficiently.

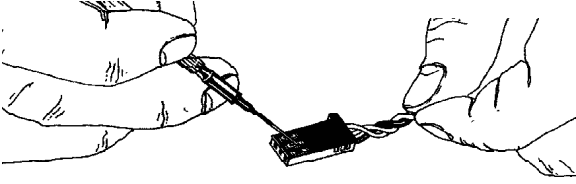
## STEP 1 CHANGING THE INPUT HARNESS

Included with the Explorer Sport is the Novak Input Plug System™ to convert the Futaba J style signal harness to be compatible with Airtronics, KO, Kyosho, JR, and Hitec radios. Refer to Figures 1 through 3 to change plug.

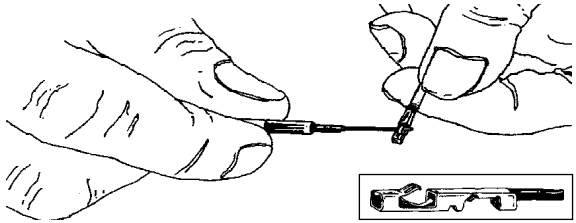


Airtronics (A) KO Kyosho (KYO) JR/Hitec

**FIGURE 1** With a small standard screwdriver, press on each of the three metal prongs until the wires are easy to remove. Remove wires.



**FIGURE 2** With the screwdriver, carefully lift up each of the metal locking tabs to the angle shown.



**FIGURE 3** Insert each pin into the correct plug slot. Each pin should "click" into place. (Airtronics plug shown)

The locking tab must not extend outside the plastic plug housing.

WHT = White wire terminal (signal)  
BLK = Black wire terminal (negative)  
RED = Red wire terminal (positive)

**CAUTION** Improper installation of these wires may cause damage to the receiver, servo, and speed control.

## STEP 2 HEAT SINK INSTALLATION

Two Micro Fin™ heat sinks have been included to provide proper cooling for the Explorer Sport. The speed control will operate cooler and run faster when the heat sinks are installed. **DO NOT** use the Explorer without the heat sinks, as this voids the warranty and may cause speed control to overheat and thermally shut-down.

### 1. INSTALL THE LEFT HEAT SINK

Place the speed control on a flat surface and press one heat sink (longer fins go down onto transistor tabs) onto the left bank of 3 transistor tabs.

**NOTE:** Do not use too much force when installing the heat sinks because you can damage the transistors or other components on the PC board. Never use a vise or pliers to install the heat sinks.

### 2. INSTALL THE RIGHT HEAT SINK

Press the second heat sink (again long fins down) onto the right bank of 3 transistors tabs.

The heat sinks should press onto the transistor tabs with a snug fit. If heat sinks are installed upside-down or shifted off-center, they will be too loose and will not work properly.

### 3. DO NOT USE GLUE

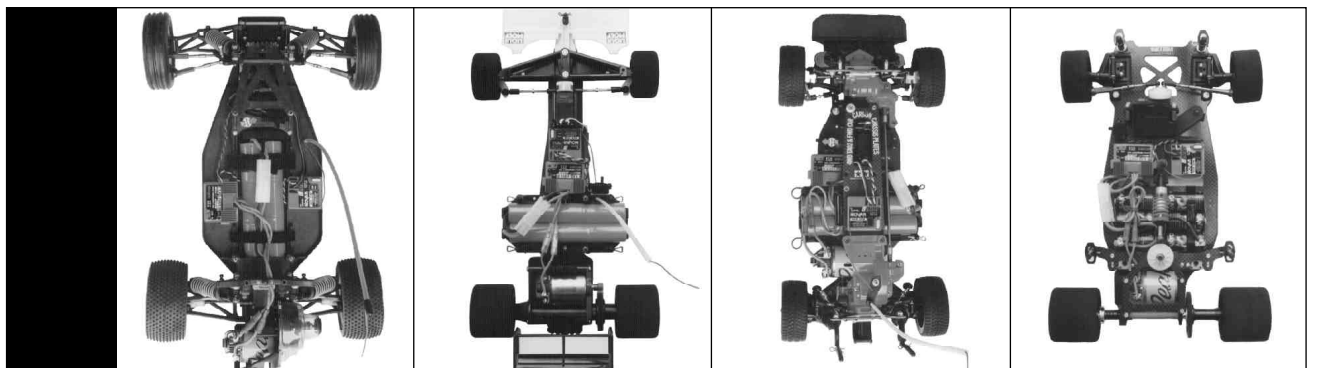
Do not use glue or other types of adhesives to attach the heat sinks to the transistor tabs.

### 4. DO NOT SHORT CIRCUIT HEAT SINKS

The two separate banks of transistor tabs or heat sinks should never contact each other or other conductive objects (metal, graphite, etc.), or they will short circuit and damage the speed control.

## STEP 3 MOUNTING INSTRUCTIONS

- 1. DETERMINE THE BEST ESC MOUNTING LOCATION**  
The speed control should be positioned away from the receiver and antenna as shown in set-up photo on back page. Choose a mounting position that will keep power wires away from the receiver and antenna. Choose a position that will provide maximum airflow through the heat sinks to allow for proper cooling.
- 2. INSTALL THE SPEED CONTROL**  
Use the included double-sided tape to mount ESC.
- 3. INSTALL THE ON/OFF SWITCH**  
Determine a convenient place to mount switch where it will be easy to get to. Mount switch using a piece of double-sided tape. If your car has a switch molded into the chassis, remove the two phillips head screws from the switch housing and reassemble switch into chassis using the 3/8" long screws that are included in the speed controls accessory kit. Note the direction of ON/OFF cover and reverse it if necessary.
- 4. INSTALL THE RECEIVER**  
Mount the receiver as far from the speed control, motor, power wires, battery, and servo as possible. These components all emit radio noise when the throttle is being applied. If your car has a graphite or aluminum chassis, place the receiver on its edge with the crystal and antenna as far above the chassis as possible. The receiver can also be mounted on the shock tower. Mount the antenna close to the receiver and trail any excess wire off the top of the antenna.
- 5. INSTALL THE ANTENNA**  
Mount the antenna as close to the receiver as possible. Trail any excess wire off the top of the antenna mast. Do not cut or coil excess wire—range will be reduced.



# EXPLORER SPORT

**NOVAK ELECTRONICS, INC.**  
18910 Teller Avenue  
Irvine, CA 92715



## STEP 4 HOOK-UP INSTRUCTIONS

Refer to set-up photo below

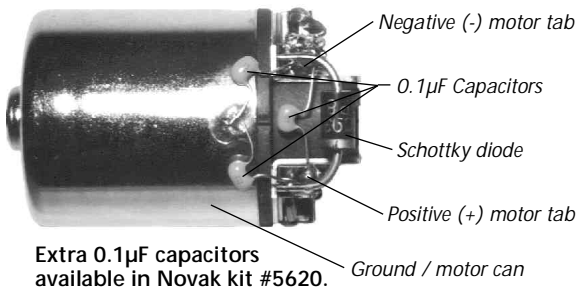
### 1. INSTALL MOTOR CAPACITORS

Electric motors generate radio noise that can interfere with your receiver and cause radio problems. Included in the accessory kit with the speed control are three 0.1µF (50V) non-polarized, ceramic capacitors. These capacitors must be installed on every motor to help reduce the noise generated by the motor and also to prevent possible damage to the speed control.

Solder 0.1µF (50V) capacitors between:

- POSITIVE (+) motor tab & NEGATIVE (-) motor tab.
- POSITIVE (+) motor tab & GROUND tab\*.
- NEGATIVE (-) motor tab & GROUND tab\*.

\*If your motor does not have a ground tab, solder the capacitor leads to the can of the motor as shown below.



### 2. CONNECT SPEED CONTROL TO THE RECEIVER

After the proper input plug plastic has been installed to match the receiver (Refer to Step 1), plug the speed control into the **THROTTLE CHANNEL** of the receiver.

### 3. CONNECT SPEED CONTROL TO THE BATTERY PACK

Plug the white JST connector from the speed control into the JST/Tamiya style connector on a fully charged 6 or 7 cell battery pack (1.2 volts DC/cell). The black wire is negative (-) and the red wire is positive (+).

### 4. CONNECT SPEED CONTROL TO THE MOTOR

Plug the bullet connector on the red wire (+) of the speed control to motor positive. Plug the other bullet connector, on the blue wire (-), to motor negative.

**USE ONLY STOCK AND MILD MODIFIED MOTORS** with the Explorer speed control—Using hotter motors and lower gear ratios will cause speed control to overheat.

A wiring kit with bullet connectors and a JST/Tamiya connector is available in Novak kit #5810.

**TIP:** Twisting the BLUE & RED motor wires one or two times around each other as they go to motor can help reduce any radio noise that may be emitted from the power wires. Refer to Set-Up photo.

### 5. OPTIONAL USE OF SCHOTTKY DIODE

The Explorer does not require an external Schottky diode. However, using one will increase the efficiency and reduce the operating temperature of the ESC.

Solder the lead **CLOSEST** to the silver stripe on the body of the Schottky diode to the **POSITIVE(+)** motor tab.

Solder the lead **OPPOSITE** the silver stripe on the body of the Schottky to the **NEGATIVE(-)** motor tab.

Schottky diodes are available in Novak kit #5640.

If installed backwards, a Schottky diode will be destroyed. The body of a bad diode will normally crack open. Replace only with Schottky diodes that have a minimum rating of 35 volts / 8 amps.

## STEP 5 TRANSMITTER ADJUSTMENT

Proper transmitter adjustment is important for optimum performance from your speed control. The basic throttle channel adjustments for the transmitter are as follows:

For proper ESC operation adjust transmitter as follows:

1. Set **HIGH ATV** or **EPA** to **maximum** setting.  
[Controls amount of throw from neutral to full throttle]
2. Set **LOW ATV**, **EPA**, or **ATL** to **maximum**.  
[Controls amount of throw from neutral to full brakes]  
[Reduce this after ESC adjustment to reduce amount of brakes]
3. Set **EXPONENTIAL** to **zero**.  
[Controls the linearity of the throttle channel]
4. Set **THROTTLE CHANNEL TRIM** to **middle** setting.  
[Adjusts the neutral position of speed control]  
[Increase or decrease after ESC adjustment to adjust coast brakes—can be used to give braking in neutral trigger position]
5. Set **THROTTLE CHANNEL REVERSING SWITCH** to **normal** position.
6. Set **MECHANICAL THROW ADJUSTMENT** to position with **2/3 throttle** and **1/3 brake** throw.  
[Adjusts pistol-grip transmitter's throttle trigger throw]

## STEP 6 SPEED CONTROL ADJUSTMENT

Before beginning this step, the speed control should be connected to the receiver and to a charged 6 or 7 cell battery pack, and the transmitter should be adjusted.

Adjustment of your Explorer speed control is required for proper operation. When the status LED is red, the speed control is in the neutral position (no throttle or brake). When the status LED is green, the speed control is either at the full throttle or full brake position.

When adjusting the speed control, **DO NOT** rotate the pots beyond their end stops—this will damage the pots.

### 1. DISCONNECT THE MOTOR

The motor is not needed for adjustments.

### 2. CONNECT THE BATTERY

Plug the Explorer Sport into a fully charged 6 or 7 cell battery pack.

### 3. TURN ON THE TRANSMITTER POWER

### 4. TURN ON THE SPEED CONTROL

Slide the ON/OFF switch to the ON position.

### 5. ADJUST THE NEUTRAL POT OF SPEED CONTROL

Rotate the **NEUTRAL** pot on the speed control until the status LED turns solid red

### 6. ADJUST THE HIGH SPEED POT OF SPEED CONTROL

Hold the transmitter throttle at full throttle and rotate the **HIGH SPEED** pot on speed control until the status LED turns solid green.

*NOTE: If the HIGH SPEED pot is adjusted too high you will reach full speed before the transmitter is at full throttle.*

### 7. SET THE BRAKES TO MAXIMUM AT TRANSMITTER

Hold the transmitter throttle at full brakes and rotate the **LOW ATV**, **EPA**, or **ATL** adjustment on the transmitter until the status LED begins to turn green. After speed control adjustment has been completed this setting can be reduced if you feel there is too much braking.

*NOTE: If the LOW ATV, EPA, or ATL on the transmitter is adjusted too high you will reach full brakes before the transmitter is at full brakes.*

### 8. CHECK OPERATION OF THE SPEED CONTROL

Connect the motor and check for proper operation. With no throttle or brake applied the status LED should be solid red and the motor should not be running. At full throttle the status LED should be solid green and the motor running full speed. At full brakes the status LED should be flickering green or solid green and the motor should not be running.

*NOTE: If the motor runs when the brakes are applied and stops when the throttle is pulled, change the THROTTLE CHANNEL REVERSING SWITCH position and repeat the Speed Control Adjustment procedures.*

### 9. SET THE COAST BRAKE AT TRANSMITTER (optional)

Adjust the **THROTTLE CHANNEL TRIM** on the transmitter to get more or less coast brake. This is accomplished by slightly shifting the neutral position. After adjustment be sure that the status LED is still green at full throttle.

## BRAKE LIGHTS

The Explorer speed control is equipped with a built in brake light circuit that can power two LEDs. A complete brake light accessory kit is available from Novak (kit #5655) and includes two high power LEDs, two brake light mounting brackets that allow mounting to most any vertical or horizontal surface of the car (including inside the tail light area of the body), double-sided tape, and wiring.

To connect brake lights to the Explorer Sport:

1. Strip about 1/8" of insulation off of both the red and the black small (26 gauge) wires that exit the back of the speed control along with the battery and motor wires.
2. Strip about 1/8" of insulation off both ends of the small (26 gauge) extension wires that are the correct length to reach the position that the brake light is mounted.
3. Solder extension wires onto the brake light wires from the speed control. If two LEDs are to be used, then solder two extension wires to each brake light wire from the speed control. Insulate solder joints with heat shrink tubing.
4. Solder the end of the extension wire from the black brake light wire to the lead on the notched or flat side of the LED. Solder the end of the extension wire from the red brake light wire to the other lead of the LED. Insulate solder joints with heat shrink tubing.

## TROUBLE-SHOOTING GUIDE

This section describes possible speed control problems, causes, and solutions.

### Steering Channel Works But Motor Will Not Run

- Speed control has thermally shut down—Allow ESC to cool down—Use milder motor or smaller pinion gear.
- Check motor connections. Check motor and brushes.
- Make sure ESC is plugged into the throttle channel of receiver. Check throttle channel operation with a servo. Check wiring color sequence of receiver signal harness.
- Possible internal damage—Refer to Service Procedures.

### Receiver Glitches/Throttle Stutters During Acceleration

- Motor capacitors broken or missing—Refer to Step 4.
- Receiver or antenna too close to speed control, power wires, battery, or motor—Refer to Step 3.
- Bad connections—Check wiring and connectors.
- Excessive current to motor—Use a milder motor or a smaller pinion gear.

### Motor and Steering Servo Do Not Work

- Check wires, receiver signal harness wiring and color sequence, radio system, crystals, battery and motor connectors, and battery pack.

- Possible internal damage—Refer to Service Procedures.

### Model Runs Slowly / Slow Acceleration

- Check motor and battery connectors—Replace if needed.
- Bad battery or motor—Check operation with another.
- Incorrect transmitter or speed control adjustment—Refer to Steps 5 and 6.
- Optional external Schottky diode (if used) installed backwards or damaged—Refer to Step 4.

### Motor Runs Backwards

- Motor wired backwards—Check wiring and reverse.
- Battery pack wired backwards—Check polarity.

### ESC Is Melted Or Burnt/ESC Runs With Switch Off

- Internal damage—Refer to Service Procedures.

\*For more help call our Customer Service Department.

## SERVICE PROCEDURES

Before sending in your Explorer for service, review the Trouble-Shooting guide and the instructions. The ESC may appear to have failed when other problems exist.

**PLEASE NOTE: Speed controls that operate normally when received will be charged a minimum service fee and return shipping costs.**

WHAT TO SEND Fill out all of the information requested on the enclosed **ESC SERVICE CARD** and return it with your speed control.

**WARRANTY WORK** For warranty work, you **MUST CLAIM WARRANTY** on the **ESC SERVICE CARD** and include a valid cash register receipt with purchase date on it, or an invoice from previous service work. If warranty provisions have been voided there will be a service charge.

**SERVICE COSTS** Customer is responsible for all service costs (parts, labor, and shipping/handling charges). Speed controls returned **UPS/COD CASH ONLY**. See **ESC SERVICE CARD** for other payment and shipping options.

**ADDITIONAL NOTES:**

- Hobby dealers or distributors are not authorized to replace speed controls thought to be defective.
- If a hobby dealer returns your speed control for service, submit a completed **ESC SERVICE CARD** to the dealer and make sure it is included with the speed control.
- To provide the most efficient service possible to our customers, it is not our policy to contact customers by phone or mail.
- Novak Electronics, Inc. does not make any electronic components (transistors, resistors, etc.) available for sale.

## PRODUCT WARRANTY

Novak Electronics, Inc. guarantees the Explorer Sport to be free from defects in materials and workmanship for a period of 90 days from original date of purchase (verified by dated, itemized sales receipt). Warranty does not cover incorrect installation, components worn by use, damage from using less than 6 or more than 7 cells (1.2 volts DC/cell) input voltage, short-circuiting heat sinks, cross-connection of battery/motor, damage from rotating pots beyond endpoints, damage from incorrect installation of FET servo or receiver battery pack, damage from excessive force while installing heat sinks or adjusting pots, not installing three 0.1µF (50V) capacitors on motor, splices to switch or receiver signal harnesses, damage from disassembling case, tampering with internal electronics, allowing water, moisture, or any other foreign material to enter ESC or get onto PC board, incorrect installation of alternate input plug plastic, allowing exposed wiring to short-circuit, or any damage caused by a crash. In no case shall our liability exceed product's original cost. We reserve the right to modify warranty provisions without notice. Because Novak Electronics, Inc. has no control over connection and use of the ESC, no liability may be assumed nor will be accepted for damage resulting from the use of this product. Every ESC is thoroughly tested and cycled before leaving our facility and is, therefore, considered operational. By the act of connecting/operating ESC, the user accepts all resulting liability.

## CUSTOMER SERVICE

### CUSTOMER SERVICE HOURS (PST)

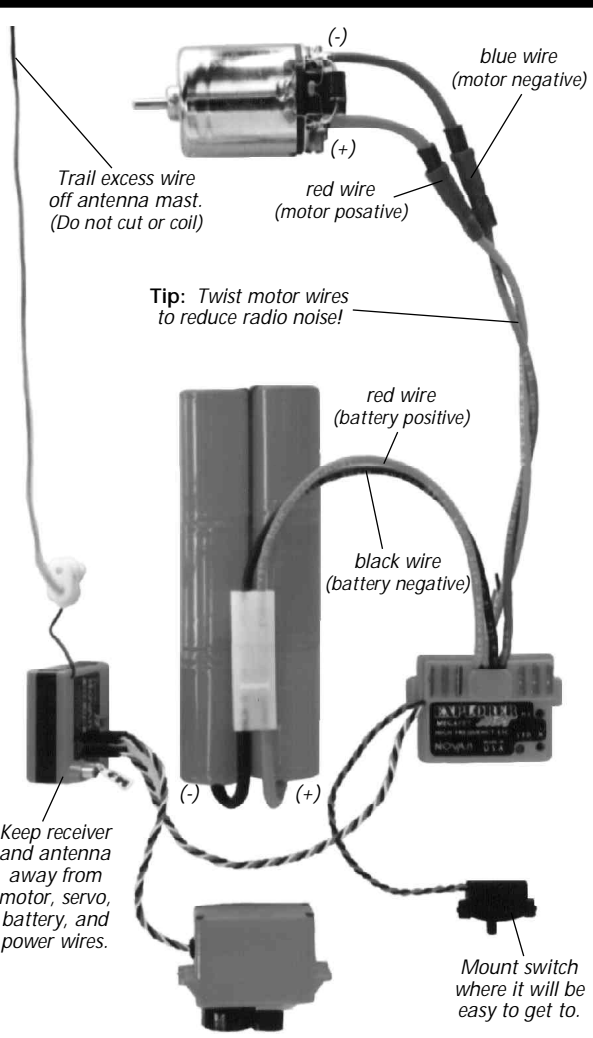
Monday-Friday: 8:00am-4:00pm  
(714) 833-8873 • FAX (714) 833-1631

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## EXPLORER SET-UP



# EXPLORER SPORT