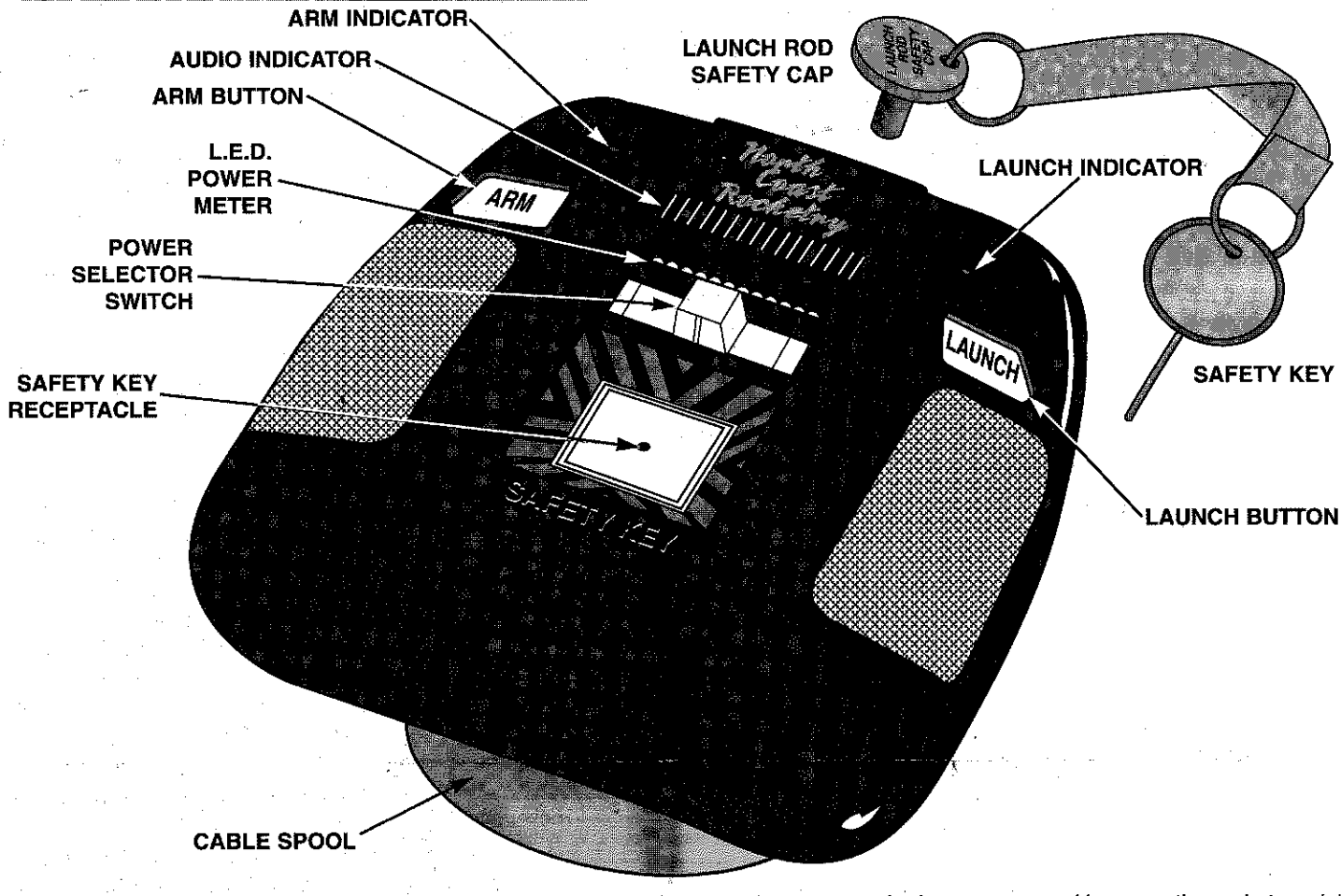
NORTH COAST ROCKETRY™ COMMAND CONTROL™ LAUNCH CONTROLLER USAGE INSTRUCTIONS



The North Coast Rocketry™ Command Control™ has been specifically designed for the demands of high electrical current model rocket engine igniter systems. By using a combination of a quality low resistance electrical cable with soldered connections and commonly available high capacity Nickel Cadmium batteries, the Command Control™ can deliver in excess of 100 watts of instantaneous electrical ignition power. This insures that the Command Control™ can be used with nearly every presently available model rocket engine igniter system in single as well as cluster ignition configurations.

Use of some electrical match and flash bulb igniters should be avoided due to activating currents too low for safe use. Test any of these types of igniters for compatibility with the Command Control™ before attempting actual launch.

The Command Control™ was designed for use with either one or two standard six-cell high capacity hobby NiCad battery packs using typical Tamiya connectors. Use of a single battery pack will reliably activate most available igniter types almost instantaneously when used in single engine applications. The second battery is not necessary when using as many as four igniters in a cluster, but its use adds an extra level of ignition insurance. Your particular igniter configuration and power requirements should be tested with one or both battery packs installed before an actual launch is attempted for dependability.

The rocket modeler may choose to have both battery packs installed at all times and use the slide switch to select which combination to use. Care should be taken, however, that continued use of only one pack does not overly discharge that pack as compared to the other. Note that the slide switch must be in the far left (off) position when the batteries are being charged.

An added Command Control™ feature is that it can be connected to an alternate exterior battery source. However, the rocket modeler will be required to design and construct a cable and connector system for these applications.

NOTE: North Coast Rocketry™ advises caution when constructing any external connector to be used with the Command Control™. Serious damage to the controller or NiCad batteries can occur with improperly designed connections. If an external battery is used, the internal NiCad batteries must be disconnected. Also, never mix or connect two different types of batteries such as one dry-cell lantern and an auto battery to the Command Control™. This practice should be avoided due to different battery construction methods and the internal battery resistances. Also, do not mix old and new batteries.

The Command Control™ uses an L.E.D. battery level meter for continuous monitoring of the battery voltage level. The range of this power meter is 6.5 volts beginning with the far left L.E.D. and 19 volts with all the L.E.D.s lit. Most L.E.D.s will not light if only one 6-cell NiCad battery is being used.

Be sure to follow all the instructions which came with your NiCad battery packs and your companion battery charger for the proper method to fully charge the batteries. The Command Control™ has been wired with two standard 5 mm charge jacks, one for each battery. These allow overnight charging with the batteries left in the controller if you have a charger that is equipped with this type of charge plug. You will be required to remove the batteries for charging if your charger is not so equipped.

NOTE: To avoid damage to the Command Control™ when charging, be sure the battery selector switch on the front of the controller is in the far left (off) position and that the safety key has been removed when charging the batteries.

PREPARE THE COMMAND CONTROL™ FOR USE

☐ **1.** Make certain that the safety key is not in the safety key receptacle and the battery selector switch is in the off/charge position before proceeding.

☐ **2.** Open the battery compartment door. Install either one or two standard 6-cell 7.2 Volt, 1.2 Ah hobby NiCad battery packs in the battery holder. Connect the Tamiya connectors and battery connectors. If only one battery is to be used, be sure to place it in the battery tray area closest to the bottom of the controller.

TEST THE COMMAND CONTROL™ FOR PROPER OPERATION

☐ **1.** Make sure the batteries are fully charged. Move the battery selector switch to the one battery position. The red L.E.D. above the red launch button should now light. This indicates that the battery pack(s) are installed correctly. If the light is dim, it may indicate that the batteries may not be fully charged. If two batteries have been installed, move the switch to the center position and again note the intensity of the L.E.D.s.

☐ **2.** Return the battery selector switch to the off/charge position. Recharge the batteries if necessary.

☐ **3.** Take the Command Control™ outside. Unroll the launch cable. Connect an igniter to the micro-clips attached to the red wire lead and the micro-clip attached to the black wire lead. Lay this end of the cable on a section of concrete or asphalt away from any flammable materials. **DO NOT install the igniter in an engine for this test.**

☐ **4.** Move the battery selector to the single battery position. If you have installed two battery packs, move the switch to the two-battery position. Insert the safety key in the safety key receptacle. The audio indicator should now begin to pulsate and the L.E.D. battery level indicator will now light. Please note that with properly charged batteries, one pack will light two or three of the leftmost L.E.D.s. Two battery packs will light approximately two-thirds of the L.E.D.s.

☐ **5.** Press and hold down the left yellow ARM button. The audio indicator will begin a steady tone and the left yellow ARM L.E.D. will light.

☐ **6.** While still holding down the yellow ARM button, press down the red LAUNCH button. The audio tone will cease and the igniter will fire.

☐ **7.** Release both buttons, return the battery selector switch to the off/charge position and remove the safety key. Discard the tested igniter.

If the Command Control™ fails any of the above tests, carefully examine your battery connections, the igniter connection, and the battery selector switch position. If the unit still does not function correctly, return it to North Coast Rocketry™ for examination or call 1-800-525-7561 for assistance.

Attach the cable spool to the back of the controller and latch it in place. Wind the cable around the spool starting with where the wire exits the back of the controller. Recharge the batteries as necessary.

USING THE COMMAND CONTROL™

☐ **1.** Always be sure the NiCad batteries in the controller are fully charged before traveling to the launch area.

☐ **2.** Set up your launch pad in a large open area away from flammable materials such as dry grass or weeds.

☐ **3.** **ALWAYS BE ABSOLUTELY CERTAIN** that the launch rod safety cap is attached to the launch rod at all times except when a model rocket is being placed on the launch pad or being launched. This insures that the safety key cannot be inadvertently left in the Command Control™ launch controller.

☐ **4.** Unwind the wire cable from the Command Control™ spool. Extend cable from the launch pad to the position chosen to place the controller.

☐ **5.** If possible, tie the free end of the cable with the micro clips to the launch pad for strain relief. Tie the wire in such a way so that there is enough length for the clips to reach the base of a rocket sitting on the launch pad.

☐ **6.** Prepare your rocket's recovery system. Prepare and install the rocket engine(s) and igniter(s) according to the manufacturer's instructions.

☐ **7.** Remove the launch rod safety cap and keep it in your possession. Slide the rocket down the launch rod. BE CAREFUL! USE CARE AROUND THE LAUNCH ROD TO AVOID EYE INJURY.

☐ **8.** Make sure the control battery selector switch is in the off/charge position. Attach the igniter clips to the igniter leads. Use the provided illustrations as a guide for proper igniter attachment. Be sure the micro-clips or igniter leads do not touch one another or the metal blast deflector.

☐ **9.** Walk to the Command Control™ and move the battery selector switch to the desired battery number. Make certain everyone is away from the rocket. Insert the safety key into the safety key receptacle. If the micro-clips have been properly attached to the igniter(s), the audio indicator will begin to beep.

☐ **10.** Alert any bystanders that you are about to launch a model rocket and check for low flying aircraft.

☐ **11.** Press and hold down the left ARM button. The audio indicator will emit a steady tone and the ARM L.E.D. will light. Warn the bystanders that the launching circuit is now armed.

☐ **12.** Give a verbal countdown from five to zero loud enough for the bystanders to hear. Still holding down the yellow ARM button, push and hold the red LAUNCH button down until the rocket ignites and lifts off.

☐ **13.** Release both buttons, remove the safety key and return the battery selector switch to the off position. Replace the launch rod safety cap on the end of the launch rod.

FOR SAFETY SAKE

ALWAYS store the Command Control™ with the battery selector switch in the off/charge position and the safety key removed from the safety key receptacle.

ALWAYS store the launch pad in a collapsed condition with the safety cap attached to the end of the launch rod.

NEVER move the battery selector from off/charge or insert the safety key in the safety key receptacle until you are actually ready to arm the system for a model rocket launch.

ALWAYS remove the safety key from the controller and re-attach the launch rod safety cap on the launch rod as soon as possible after rocket lift-off.

NEVER leave the safety key in the safety key receptacle between rocket launches.

Remove the launch rod safety cap ONLY when a model rocket is being placed on the launch pad. Then, keep the safety cap and key in your possession until you are ready to launch.

(6-96) 84531

CLUSTER MOTOR PREPARATION AND IGNITION

This instruction sheet illustrates the recommended procedures required to insure Estes Pro Series™ cluster motor ignition. Any deviation from these procedures, or experimentation, or use of other than the Estes Command Control™ ignition system and Solar Igniters™ may produce less than perfect motor ignition.

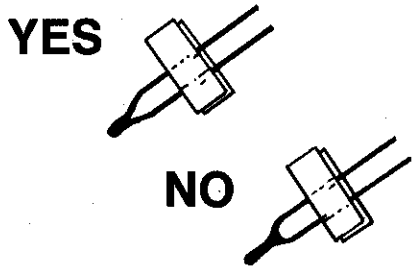
Always remember that reliable cluster motor ignition is a combination of properly installed igniters, a high current launch control system and battery, and proper electrical connections. The Estes Pro Series™ cluster ignition system has been carefully tested to meet these requirements and is strongly recommended.

In order to insure that as many as four Estes Solar Igniters™ function properly, the launch control system must be able to deliver over ten amps of instantaneous electrical current to them. The Estes Command Control™ launch controller exceeds this requirement by using a combination of heavy #18 cable and a standard R/C high current six-cell NiCad battery pack. The system even allows the use of two of these NiCad packs for over 100 watts of available ignition power for most any imaginable cluster or igniter system.

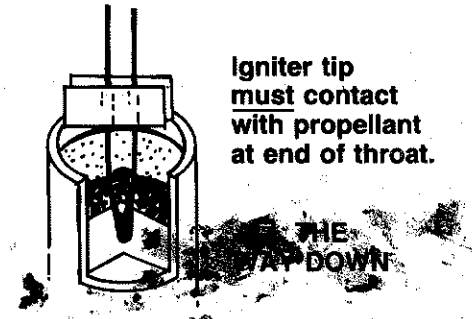
In addition, the new Estes™ igniter holders add important ignition reliability to the Pro Series™ cluster technique. Their design and use holds the pyrotechnic mixture of Solar Igniters™ securely in place against the motor propellant. This insures positive and instantaneous heat flow to the propellant. Failure to use these igniter holders may lead to unreliable ignition of Estes Pro Series™ cluster model rockets.

MOTOR IGNITER PREPARATION

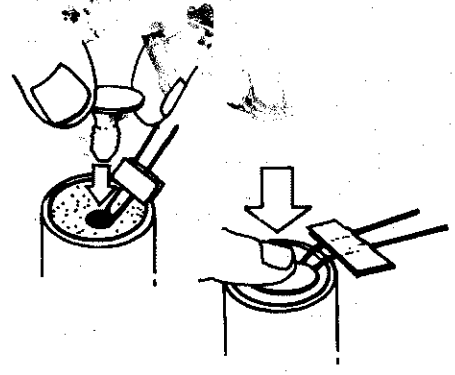
1. Separate igniters with a pair of scissors. Check igniters for possible flaws. Any Solar Igniter™ which is missing a pyrotechnic ignition bead should be discarded or returned to Estes or to your dealer for replacement. Check the two wire leads to be sure they are not touching at any point.



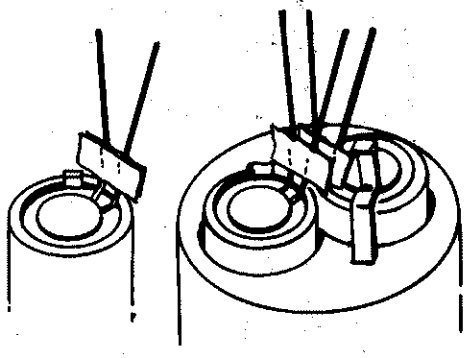
2. Hold or stand motor upright. Drop an Estes Solar Igniter™ straight into the nozzle. The pyrotechnic bead will then be in direct contact with the motor propellant.



3. Still holding the motor upright, push an Estes™ igniter holder all the way into the nozzle until it stops. The igniter wires will automatically bend to one side of the motor as the holder is pressed into place. Repeat steps two and three for all motors to be used in the cluster.



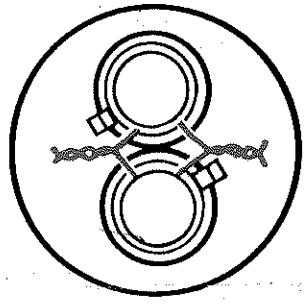
4. Bend the igniter leads straight up at the outside edge of the motor as shown. Install the motors in their motor mounts being careful to turn them so that the igniter leads touch each other in pairs as described to the right. Study the different motor cluster arrangement illustrations carefully for clarity.



5. Twist the igniter leads together as described below.

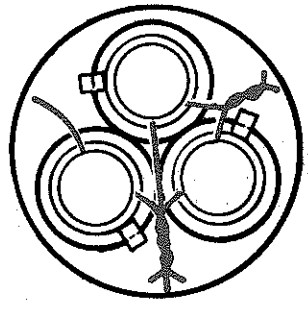
Two Motor Cluster

Rotate the two motors in their motor mounts until the tape on the igniter leads touch as shown in Step 4. Twist the wire leads together tightly. Spread the leads outward from the center of the rocket.



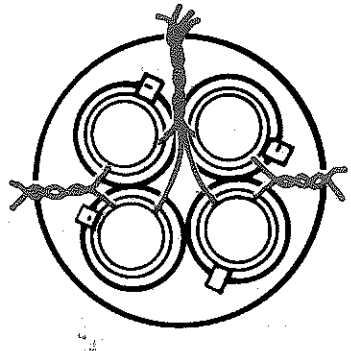
Three Motor Cluster.

Pay careful attention to the illustration. Rotate two of the motors in their motor mounts until the tape on their igniter leads touch. Rotate the third motor until one igniter lead touches the inside lead pair as shown. Twist these three inside igniter leads together tightly. Now twist the outside pair together. Spread the outside leads outward. Leave the center bundle standing.



Four Motor Cluster

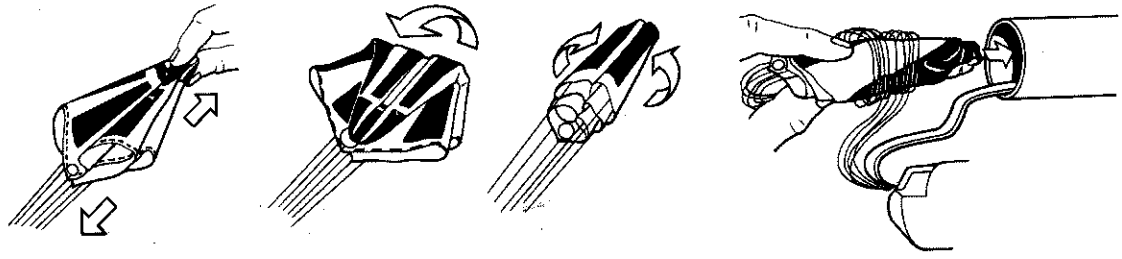
Pay careful attention to the illustration. Rotate the motors in their mounts until tape on the igniter leads touch. Carefully twist the four inside igniter leads into a bundle. Then twist the two outside igniter lead pairs together. Spread the outside leads outward. Leave the center bundle standing.



PREPARE ROCKET FOR FLIGHT

1. Hold the recovery system shock cord to one side of the inside of the body tube. Insert 10 to 16 squares of Estes™ recovery wadding into the open end of the rocket body. The wadding should remain loose. NEVER tamp the wadding tight into the tube.

2. Fold the parachute and wrap the shroud lines around it as shown. The lines should be tight enough so that the parachute will slide easily inside the rocket body. Insert the parachute into the rocket onto the top of the recovery wadding. Then insert the shock cord into the rocket on top of the parachute.



3. Install the nose cone into the forward end of the rocket body. Be certain the fit is neither too loose or too tight. If the nose cone falls out of the rocket body when the model is pointed downward, the fit is too loose. If while pointed downward, the nose cone can't be shaken out of the tube, the fit is too tight. If too loose, wrap tape around shoulder for snug fit. If too tight, lightly sand shoulder slightly for looser fit.

LAUNCH SITE SELECTION

Always fly model rockets from large open fields away from power lines, airports, buildings, and trees. The launch site chosen for launching Estes Pro Series™ model rockets should be a minimum of 1/4 mile long on each side. There should never be dried grass or weeds at the site which are easily combustible. Always place the launch pad in the center of the field whenever possible.

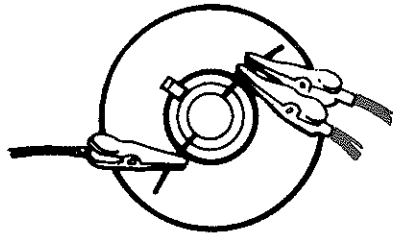
LAUNCH PROCEDURE

1. Remove the safety key and launch rod safety cap from the launch rod. **HOLD THE SAFETY KEY AND SAFETY CAP IN ONE HAND.** Carefully align the rocket launch lugs with the launch rod and slide the rocket down the launch rod and onto the blast deflector. Adjust the igniter leads as necessary so that they do not touch the metal blast deflector.

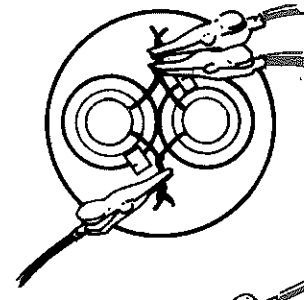
2. **MAKE CERTAIN THAT NO ONE IS HOLDING THE LAUNCH CONTROLLER AND THAT BATTERY PACKS ARE NOT CONNECTED AT THIS TIME. KEEP SAFETY KEY AND SAFETY CAP IN ONE HAND.**

3. Attach the launch system micro clips to the igniter leads. (It is strongly recommended that the inside jaws of the micro clips be cleaned before each launch. This can be done quite easily by simply passing a folded piece of fine sandpaper back and forth between the closed jaws a few times.)

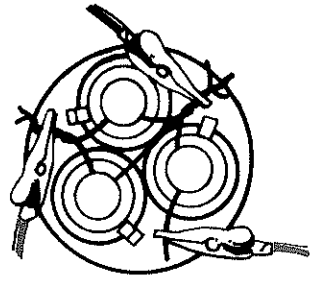
Single Motor Arrangement



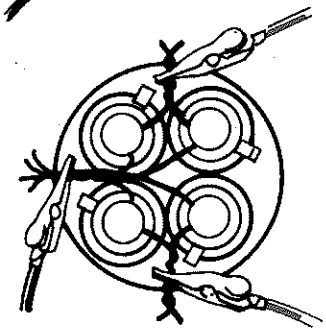
Two Motor Cluster Arrangement
Attach the BLACK wire clip to one of the twisted igniter lead pairs. Attach BOTH RED wire clips to the other twisted igniter lead pair.



Three Motor Cluster Arrangement
Attach the BLACK wire clip to the center twisted igniter lead bundle. Attach one RED wire clip to the outside twisted igniter lead pair. Attach the remaining RED wire clip to the remaining single igniter lead.



Four Motor Cluster Arrangement
Attach the BLACK wire clip to the center twisted igniter lead bundle. Attach one RED wire clip to one of the outside twisted igniter lead pairs. Attach the remaining RED wire clip to the remaining outside twisted igniter lead pair.



4. Examine the connections carefully. Be certain that the micro clips do not touch one another or the metal blast deflector. Be certain that none of the twisted igniter leads have loosened. If so, disconnect the micro clips, remove the rocket from the launch pad, and re-twist the igniter leads.

5. Check to be certain the launch controller is at its maximum distance from the launch pad. Move it as necessary so that the sun will be at your back at launch.

6. Still holding the safety key and safety cap, connect a standard six-cell 1.2 amp-hour NiCad battery pack to either cable connector. Do not remove the connector jumper from the cable unless you are using two NiCad batteries. (Two NiCad battery packs are NOT required when launching any of the Estes Pro Series™ two, three, or four motor cluster model rockets.)

7. Give a verbal warning to others that you are ready to launch your rocket and that they need to move back a minimum of 30 feet (9 meters) from the launch pad.

8. Insert the safety key into the launch controller. The continuity light should now glow indicating the launch circuit is complete.

9. GIVE A SHORT AUDIBLE COUNTDOWN...5...4...3...2...1...LAUNCH!

Press the launch button and hold it down until ignition occurs and the rocket lifts off. Release the launch button as the rocket leaves the launch pad. Remove the safety key from the controller as you follow the rocket skyward.

Do not place another rocket on the launch pad until the battery has been disconnected from the controller cable. Return the safety cap to the end of the launch rod as soon as possible.