

The Ray Allen Company Inc.

2525-8 Pioneer Avenue, Vista, CA 92081 USA Phone 760 599 4720 FAX 760 599 4383

www.rayallencompany.com



INSTALLATION INSTRUCTIONS FOR

G305 STICK GRIP AND G307 STICK GRIP

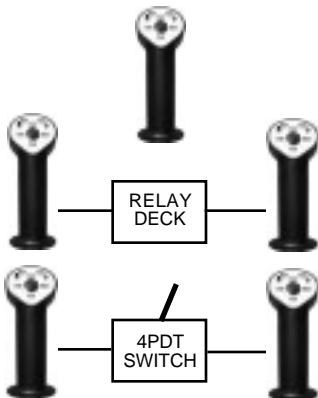
INTRODUCTION

The G305 and G307 stick grips feature four individual SPDT momentary contact switches to control one or two axis electric trim. These switches are triggered via a traditional 4-way "hat" type activator. A slotted two axis faceplate adds to the very positive switching action. There is a momentary contact, SPDT Push-To-Talk (PTT) switch located on the front side of the grip. The G307 grip has two additional switches on the faceplate that can be used to control radio frequency select, nav display switching, autopilot functions, etc.

The hand grip itself is made out of a very strong BASF composite that has excellent UV resistance. The entire grip has a textured, non-slip finish. The G305 and G307 grips are 6.5" (165 mm) tall and 2.5" (64mm) wide.

All Ray Allen Stick Grips are designed to fit any stick size up to 1 1/8" diameter with the use of spacers. Three spacers are included with each grip enabling easy installation on 3/4", 7/8" and 1" sticks. The stick grips include precut and stripped 26 gage Teflon insulated 19 strand wire for sharing ground and 12V+ between the switches. A longer wire bundle is supplied for the long runs exiting the grip.

Before wiring the switches in your stick grip, you must decide how they will be utilized.



* ONE GRIP - If you are using only one stick grip, wire the switches as shown in Style 1 (page 4).

* TWO GRIPS - If you are planning to install two stick grips in your plane so the copilot can also control the trim systems, you must wire the switches as shown in Style 2 using relays (page 6). With this method either control stick can control the aircraft trims at any time. This is the most popular method of wiring two stick grips.

* TWO GRIPS (ALTERNATIVE) - If you want to install two stick grips, but do not want to use relays, you can install a switch that transfers control from one grip to the other. In this case, wire the switches as shown in the ALTERNATIVE version of Style 1 (page 5).

Warning: Installation and use of Ray Allen Company products is the responsibility of the aircraft designer and builder. Use of Ray Allen products in any application which will exceed their capability can cause failure leading to injury or death.

ASSEMBLY TIPS

Soldering will be required during the assembly of your stick grip. Here are some helpful hints on soldering technique:

- * Use a small, "pencil" style soldering iron (less than 40 watts) with a cone or round pointed tip. Keep the tip clean at all times.
- * Use good quality, rosin core (60/40 tin/lead content is ideal). It's available at electronics stores such as Radio Shack.
- * Let the soldering iron thoroughly warm up before attempting to solder.
- * Push the stripped end of each wire through the holes in the switch's soldering tabs before applying solder. Otherwise, you would have to push the wire end through the solder (not easy).
- * Place the tip of the soldering iron against the soldering tab and wire end. Let the tab and wire heat up for a couple seconds, then add solder to the joint. The solder should flow smoothly around the wire/tab junction.
- * Remove the solder from the wire/tab joint just before removing the tip of the soldering iron.
- * Do not use too much solder on the wire/tab joints. A big blob of solder is not acceptable on some joints because of possible interference with other parts. If you have too much solder on a joint, clean the soldering iron tip and heat up the joint. Excess solder will flow onto the tip and off the joint.
- * **A good solder joint will flow smoothly and look glossy after cooling.** A frosty and jagged looking solder joint indicates that the solder was not hot enough or the flux was allowed to burn away before the solder joint was completed.

About the wires:

Your Ray Allen stick grip comes to you with precut and stripped, 26 gauge, 19 strand, Teflon insulated wires. Each of these wire pieces are cut to specific lengths for specific connections. In the following instructions, you will be told which wire lengths should go where, eliminating any guess work on your part. **Please follow the wiring sequence shown in the instructions. If you do not route the wires exactly as shown, clearance problems will arise during final assembly of the grip.**

About the labels:

A die cut, Lexan covered label sheet is supplied in the kit. It is important to clean the recessed areas in the top case with alcohol to remove any oils that would prevent the adherence of the labels.

About the switches:

The trim and PTT switches in the G3 series stick grip are all 15 amp, single pole, double throw (SPDT), Honeywell Microswitches. These high quality switches were specifically chosen for their superior tactile feedback. Each switch has a common terminal on the side and a normally closed (NC) and a normally open (NO) terminal on one end. As you look at the switches in the switch module, all the switch terminals **close** to the center are normally **closed** (NC), all the terminals furthest away are normally open (NO).

NOTE: The following wiring diagrams only show the Ray Allen G305 stick grip. The G307 control stick grip has two additional switches installed in the faceplate. We include 10 extra feet of wire and 4 extra cut and stripped pieces for use with extra switches. This should be more than enough to complete the wiring of the two extra switches. There is a simple wiring diagram for these switches on page 5. However, we cannot supply specific wiring instructions because they can be used for such a wide variety of functions on your aircraft or avionics.

STEP 1. DISASSEMBLE THE STICK GRIP

The G3 series stick grips are assembled at the factory to check fit and finish. The first step is to separate the grip halves. Use the 3/32" hex end wrench to remove the four 4-40 X 7/16" socket head screws at location A,B, C and D. See Figure 1 on the opposite page for details.

As you pull the halves apart, be careful not to let the switch module fall to the floor. Remove the switch module and notice how it is supported in the grooves molded into the grip halves. See Figure 2. The PTT switch can be removed by lifting it from the support pylons. Note the switch's orientation.

The grip is normally assembled with a black faceplate. To change the faceplate to the optional gray or tan color, the 4-way switch activator must be removed. This is done by removing the screw, washer and spring in the bottom of the switch module. See Figure 3 on the opposite page for details. Remove the 4-way switch activator, exchange faceplates and reassemble. Use caution not to over tighten the 4-way switch activator screw.

Figure 2



Figure 1

Screw holes A, B, C and D are for securing the grip halves together with 4-40 X 7/16" socket head screws.

DO NOT over tighten when reinstalling these screws!

Screw holes 1 and 2 are for mounting the grip to your control stick with 4-40 X 1/2" socket head screws.

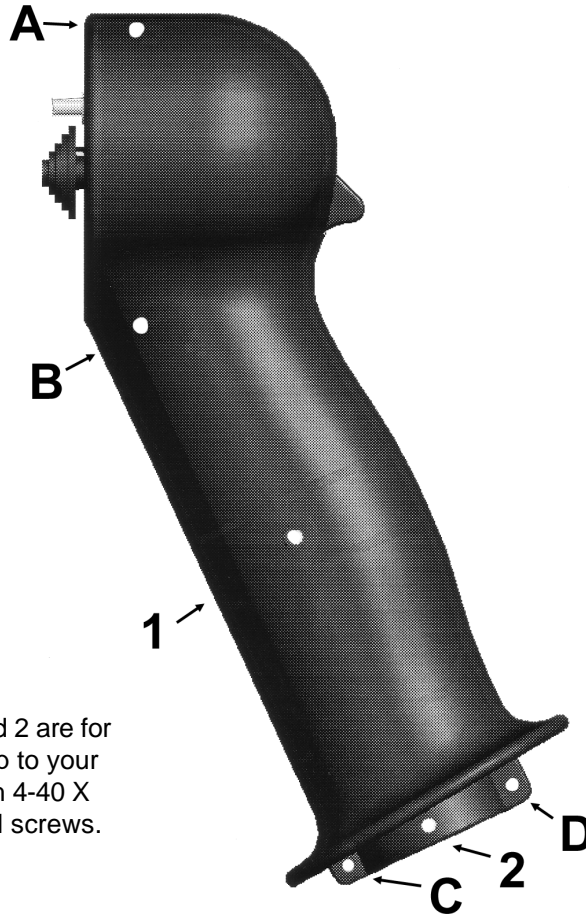
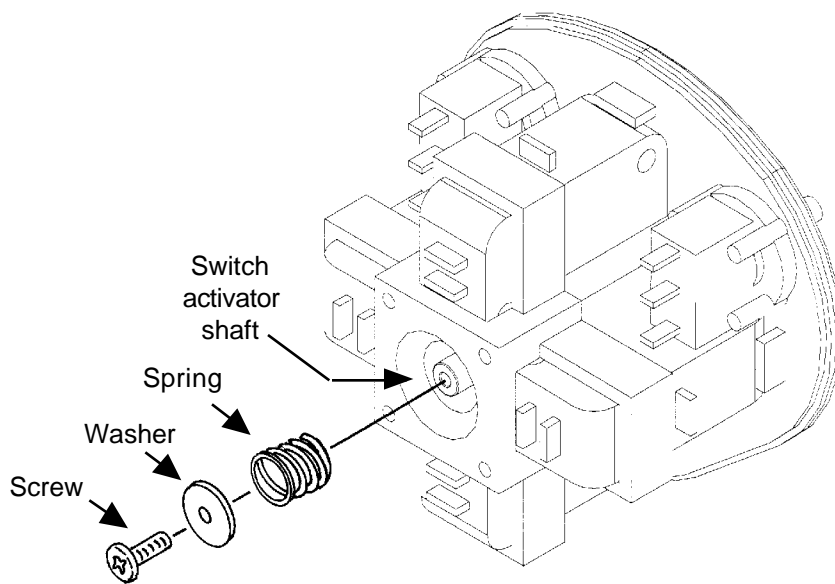


Figure 3



STEP 2. WIRING YOUR STICK GRIP

Wiring style 1

Wiring style 1 as shown in Figure 4 will directly control Ray Allen trim servos without relays. The wiring shown in the following diagrams can be completed with the seven precut and stripped wire segments included with the grip. The 20 ft. of wire (also included) can be cut and used to exit the grip and control stick. To avoid confusion, be sure to mark these exiting wires before closing the grip halves.

Figure 4 - Wire style 1

NC = normally closed
NO = normally open
C = common

NOTE: All the switch terminals close to the center of the switch module are NC. All the terminals furthest away are NO.

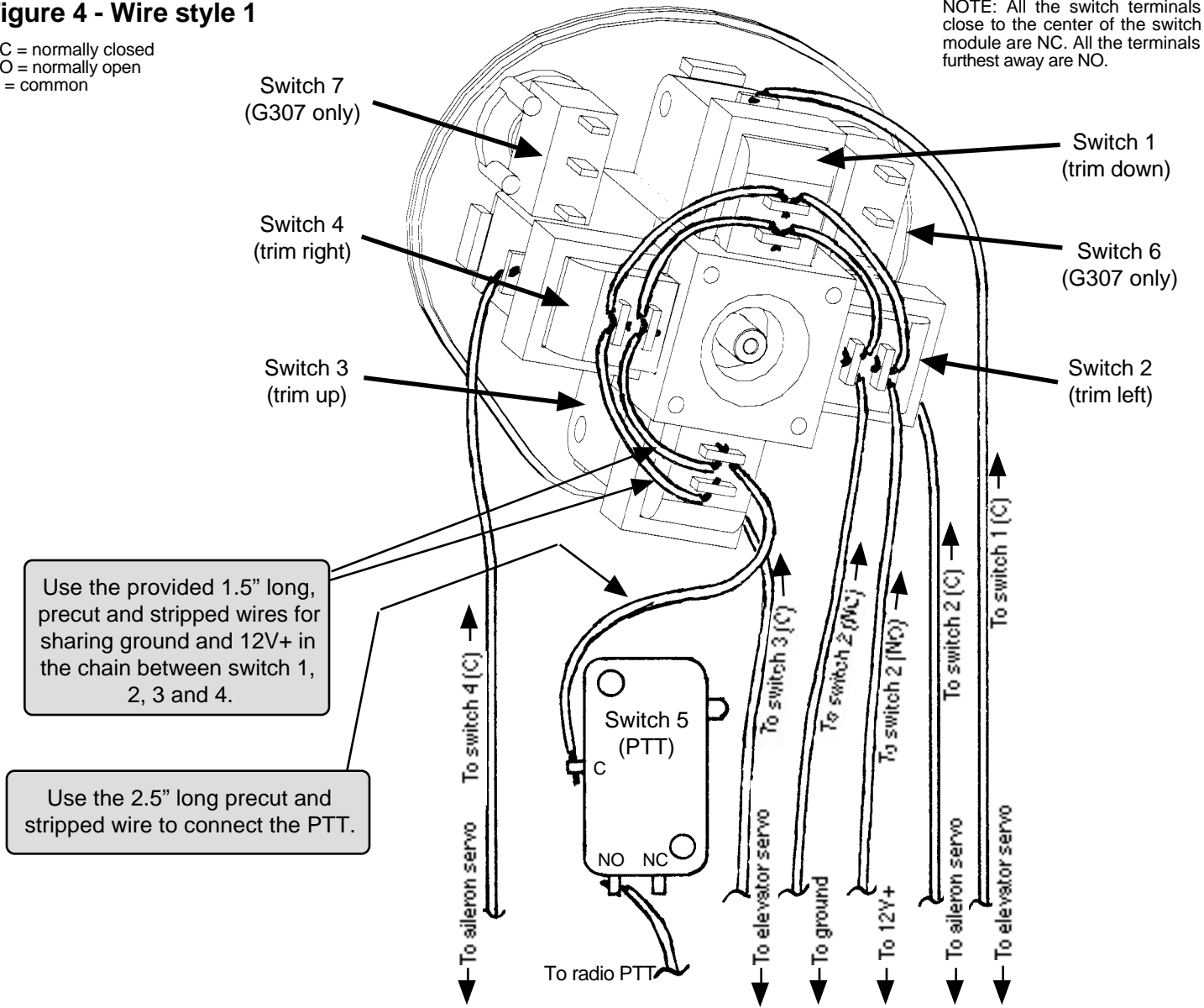


Figure 5 - Wire schematic for style 1

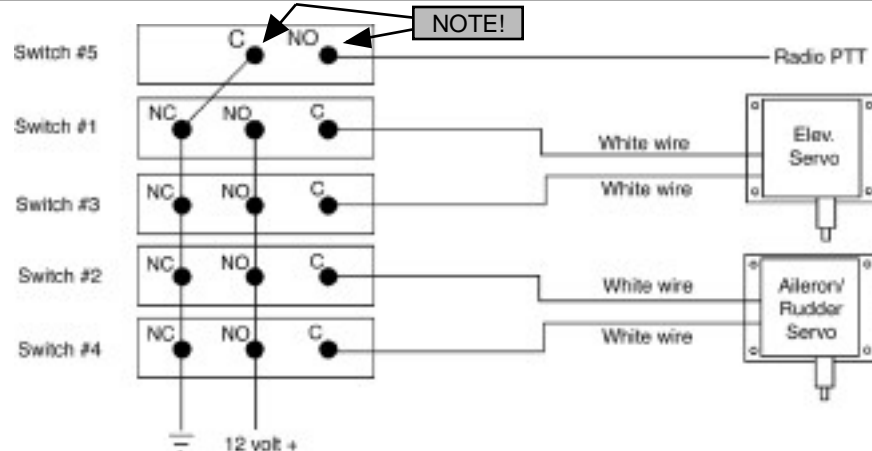
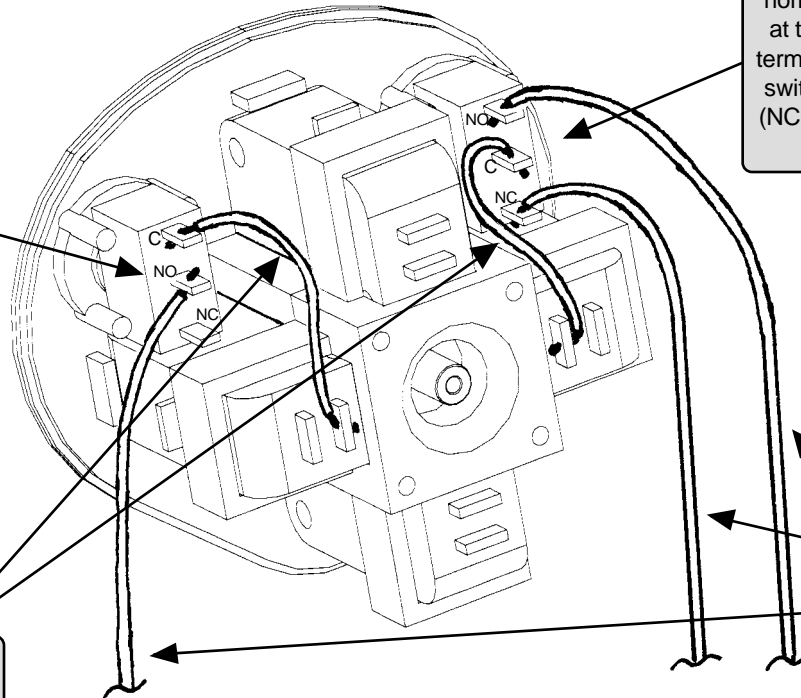


Figure 6 - Wiring the additional G307 switches

NC = normally closed
 NO = normally open
 C = common

Switch type 1 is a momentary contact SPDT pushbutton switch. It is usually mounted with the common (C) terminal at the top. The normally open (NO) is in the middle of the switch. The normally closed (NC) terminal is at the bottom of the switch.

Switch types 2, 3, 4, and 5 are toggle switches. They are usually mounted with the normally open (NO) terminal at the top. The common (C) terminal is in the middle of the switch. The normally closed (NC) terminal is at the bottom of the switch.



Use 1.5" long precut and stripped wires to share ground with other switches.

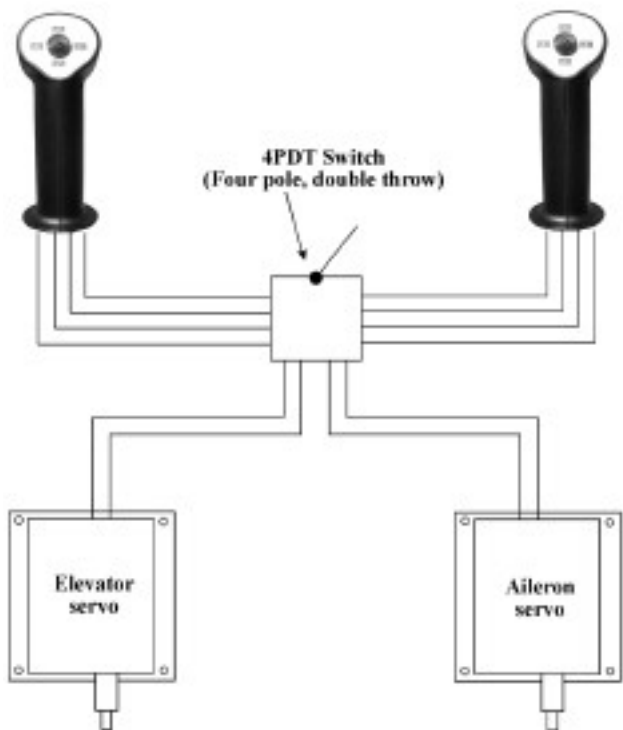
These wires that exit the grip are cut from the 30' bundle of 26 gage wire included with the G307 stick grip.

Wiring style 1 (alternative version)

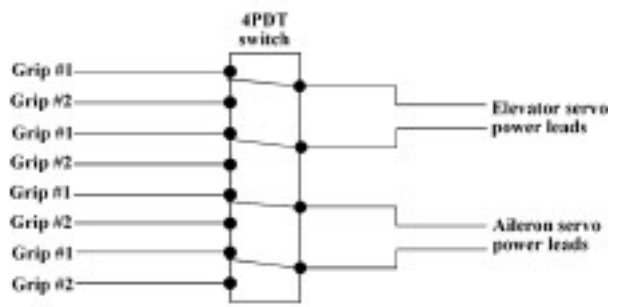
Use the wiring diagram below if you want to do any of the following:

- *You have already installed one stick grip using wiring style 1 and now you want to install a second stick grip.
- *You want to install two stick grips and do not want to use relay decks.
- *You have Ray Allen rocker switches already installed and want to install a stick grip.

Figure 7 - Wiring style 1 (alternative version)



With this wiring method a 4PDT switch is used to transfer control of the trim servos from one stick grip to the other.



Wiring style 2

Typically, wiring style 2 is used when two stick grips are installed in the aircraft. Either stick grip can trim the aircraft. Only two terminals on each switch are used. This wiring style requires the use of relays.

When the switch is activated, it completes a circuit that sends a ground signal to a relay. The relay controls the servo. In the wiring schematic on the bottom of this page, the Ray Allen REL-1 Relay Deck sends the power to the servo.

Figure 8 - Wire style 2

NC = normally closed
NO = normally open
C = common

NOTE: All the switch terminals close to the center of the switch module are NC. All the terminals furthest away are NO.

For wiring G307 switches, refer to wiring details in Figure 6 on page 5. NOTE! The ground for these G307 switches is now taken off the OUTER (NO) ring of terminals.

Use the provided 1.5" long, precut and stripped wires for sharing ground in the chain between switch 1, 2, 3 and 4.

Use the 2.5" long precut and stripped wire to connect the PTT.

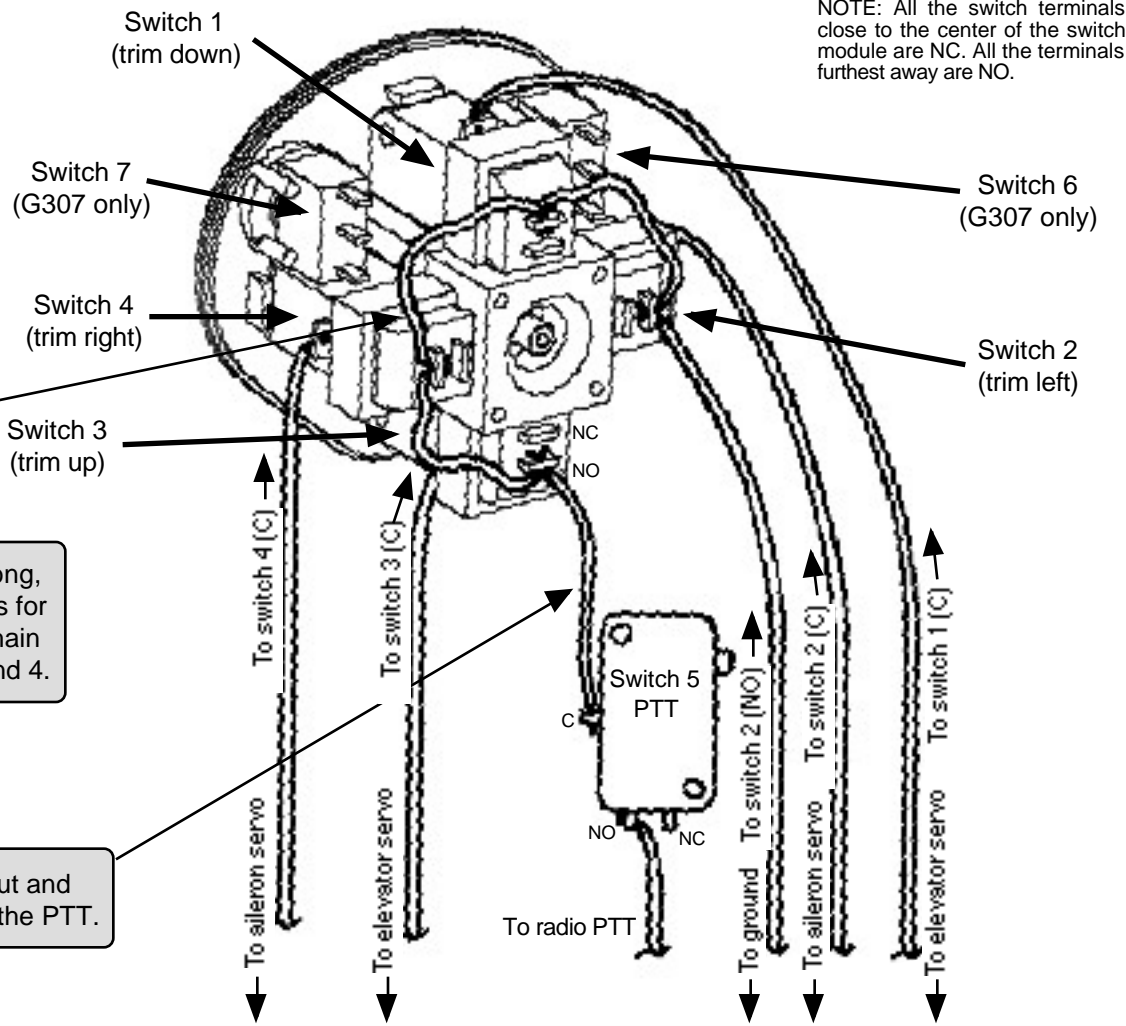
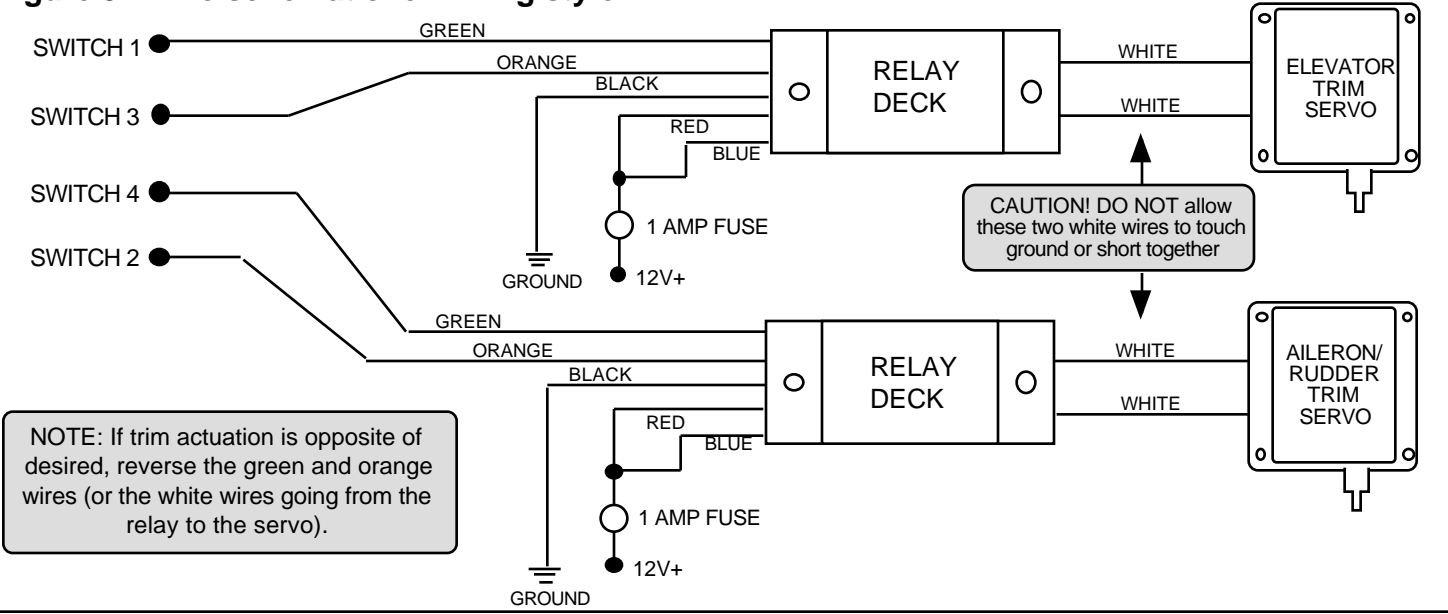


Figure 9 - Wire schematic for wiring style 2



NOTE: If trim actuation is opposite of desired, reverse the green and orange wires (or the white wires going from the relay to the servo).

STEP 3. REASSEMBLY AND WIRE ROUTING

With the switches wired and *the exit wires labeled*, you are now ready to reassemble your stick grip. However, it is advisable to drill and tap your control stick for the grip BEFORE you spend too much time reassembling. See "Step 4. Mounting Stick Grip" on the page 8 for details.

Reassembly is accomplished by first reinserting the switch module into the left grip half. It is critical that both the faceplate and the switch module fit tight INSIDE the groove! See the pictures below for our recommended wire routing. Note that you can exit the wires out of the grip through your control tube or forward of the stick tube.

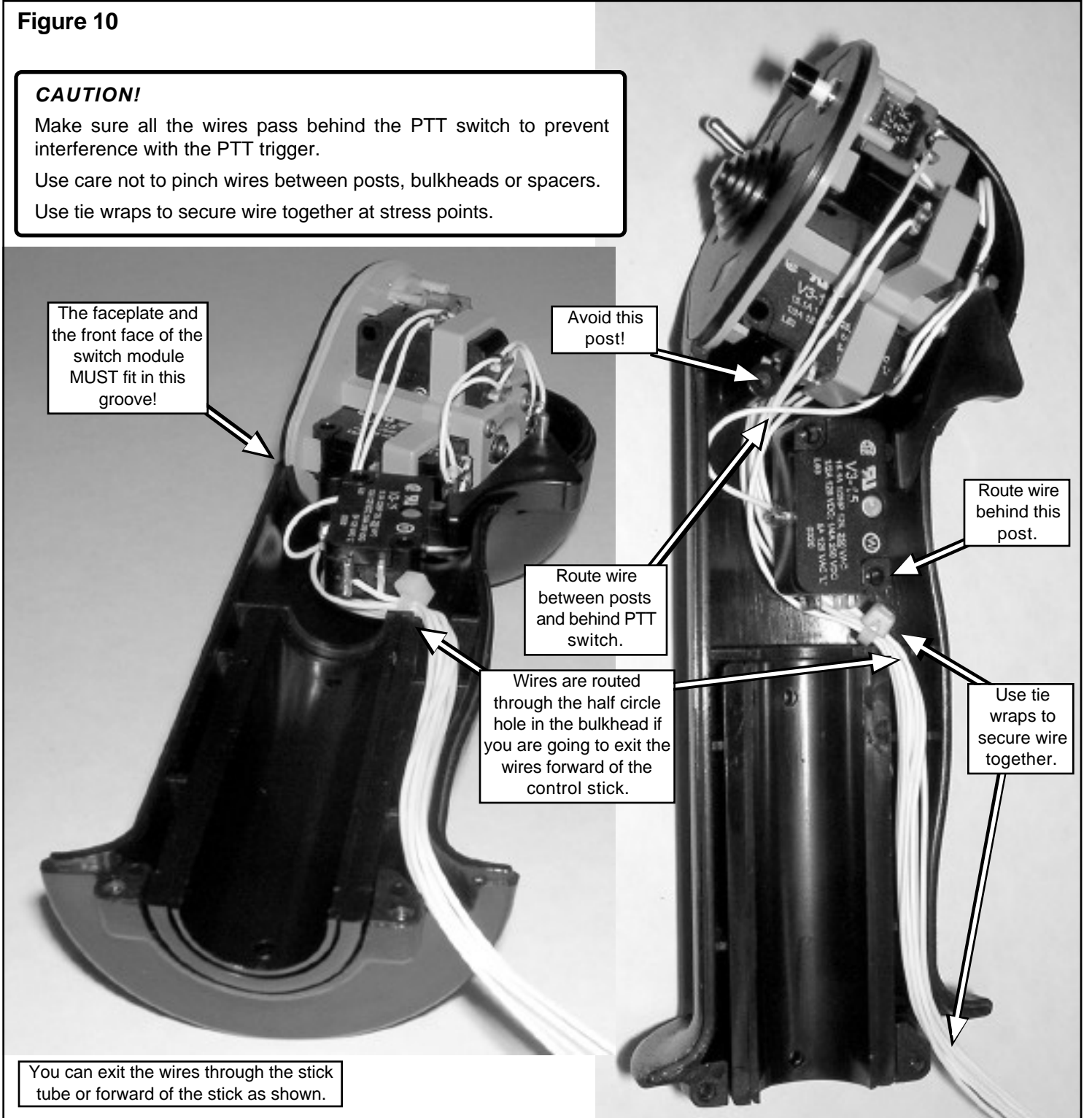
Figure 10

CAUTION!

Make sure all the wires pass behind the PTT switch to prevent interference with the PTT trigger.

Use care not to pinch wires between posts, bulkheads or spacers.

Use tie wraps to secure wire together at stress points.



STEP 4. MOUNTING THE GRIP

Choose the proper spacer size or combination of sizes for your control stick diameter. Align the spacers using the screw hole locations and tack glue the spacers into the grip for easier assembly (we use Testors plastic model cement). Notice that the spacer's screw holes only align with the grip side in one orientation. See Figure 11 for details.

Assemble the grip and position it onto your control stick. Check carefully for clearance problems. You may have to cut down your control stick tube to avoid your instrument panel.

Using the screw holes 1 and 2 on each grip half as drill guides, carefully drill #43 size holes through your control stick tube. Some control stick tubes are plated, so use a high quality drill (TiCN or Carbide). Remove the grip and tap all four holes in the control stick tube to a 4-40 thread size.

Secure the grip to your control stick using the provided four 4-40 X 1/2" socket head cap screws as shown in Figure 12.

