

INSTALLATION & OPERATION

THE *Bonner*

 **DIGIMITE 4RS**

RADIO CONTROL SYSTEM

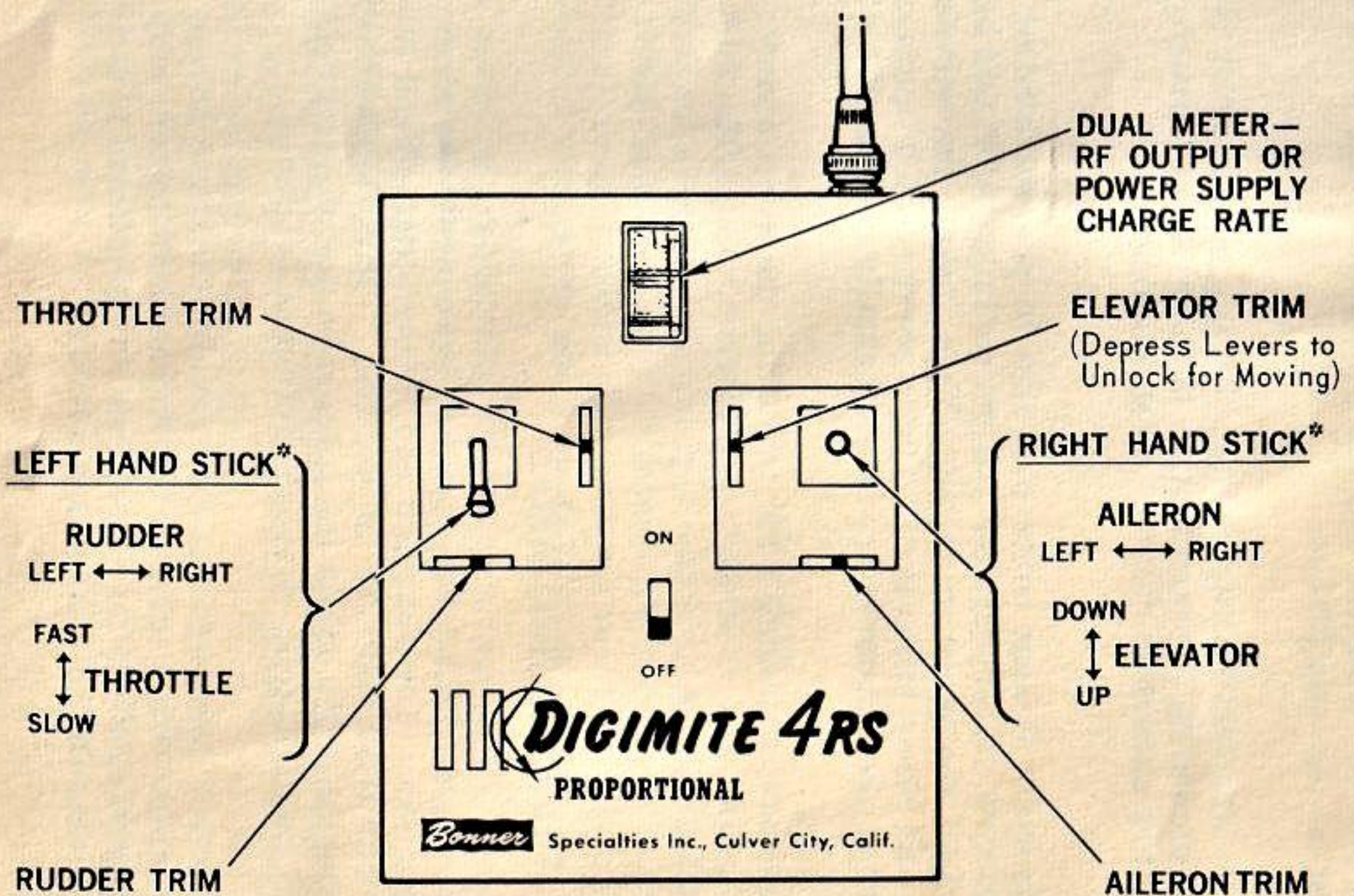
BONNER SPECIALTIES INC. 9522 W. JEFFERSON BLVD. CULVER CITY, CALIF. 90230

INTRODUCTION

These instructions will introduce you to the finest radio control system available in our rapidly advancing R/C industry. Keynote features of the Digimite 4RS are its small size, light weight, unmatched control accuracy and reliability, and low maintenance costs. The system was designed for the remote control of model airplanes, and these instructions have been written to cover this usage. Installation in R/C boats, cars, etc. is similar.

NOTE: The transmitter and receiver have been completely tuned and adjusted at the factory. Under no circumstances should the purchaser attempt any type of adjustment on either unit. The batteries furnished with the system are 500 mah G. E. pen cell type Nickel-Cadmium, rechargeable.

IT IS ILLEGAL TO OPERATE THIS TRANSMITTER WITHOUT A CITIZENS BAND LICENSE. Form 505 for securing this license is available from your nearest Federal Communications Commission office.



* The 4RS transmitter is built in configuration suitable for right- or for left- hand elevator. The right-hand configuration is shown above. On the left-hand configuration the throttle and aileron controls are connected to the RH stick and the rudder and elevator controls are connected to the LH stick.

CHARGING THE BATTERIES

Digimite battery packs utilize Nickel-Cadmium pen cells constructed by General Electric. Although the batteries are charged at the factory prior to shipping, they might be received in a discharged condition. Therefore charging would then be required prior to initial operation of the Digimite system.

As shown in Figure 2, the receiver battery adapter is plugged directly into the appropriate socket on the bottom of the transmitter and then into the battery lead. Check index marks while connecting. Charging the transmitter battery without the receiver battery can not be done since both batteries are charged in series.

The series charge rate of the transmitter and receiver batteries is indicated on the transmitter meter. The normal charge rate is approximately 40 milliamperes. A 24 hour charge insures that the batteries are ready for use.

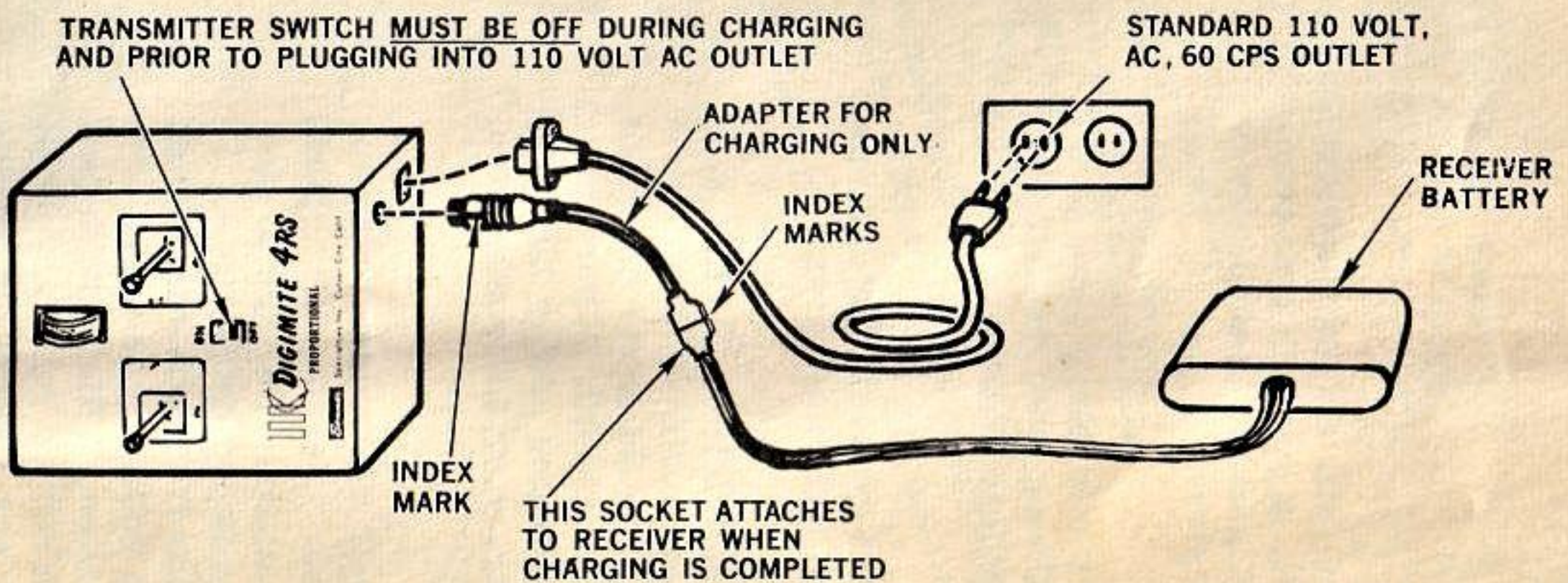


Figure 2. Charging the Batteries.

If desired, flight pack charging may be performed through the airplane harness as shown in figure 3. with the equipment installed in the airplane.

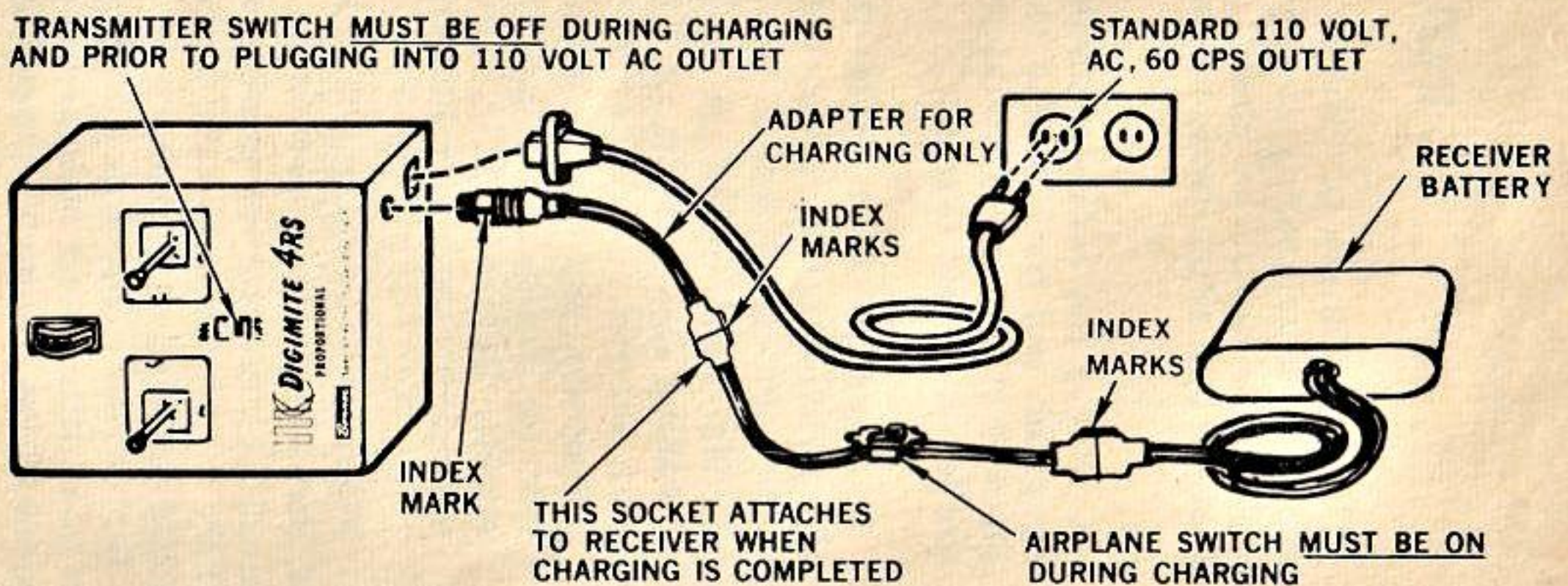


Figure 3. Charging the Batteries—Receiver Battery Being Charged Through Airplane Harness.

INSTALLATION

The installation of the Bonner Digimite system is straightforward. Good practices commonly employed when installing radio systems are acceptable. These practices should include the following usual precautions to keep electrical noise from the superheterodyne receiver:

1. Route the receiver antenna directly out of the fuselage close to the receiver and back to the top of the fin. This places it far from any electrical wiring and metal linkage. Do not route the antenna back through the fuselage and then out.

2. Avoid metal-to-metal linkage joints as these generate radio noise. Use nylon clevises when control horns are metal and vice-versa.

3. The servo cases are marked for direction with letters D, R, and F, meaning Down, Right, or Fast. To adjust neutral position, place servo with screws up and remove 2 flat head screws. Hold lower case half, output arm and wire at grommet while cover is lifted off. Wiper contact may be shifted to alter neutral position by turning slider adjusting screw. Before closing, operate servo to be sure your adjustment does not make output arm hit either end of case.

Figure 4 shows a typical fuselage installation of the rudder, elevator and throttle control servos in a low wing model. Servos are placed according to center-of-gravity and space considerations. Be sure to securely mount the servos to a plywood tray or to hardwood cross rails. It should be noted that whenever several devices operate from one servo (such as for rudder control and nose wheel steering both ends of the servo arm can be utilized for a neat and workmanlike installation. Rigid push-pull rods made of 1/4 inch square hardwood or 3/8 inch square balsa should be used to the elevator and rudder horns to prevent any flexing under air loads or "G" loads.

The switch is attached to the fuselage side with the button protruding. The wiring harness may now be connected and the wire bundles are stowed under foam rubber in out-of-the-way places.

The battery should be wrapped in foam rubber or foam plastic prior to sliding in place. To stop damaging forward motion in the event of a crash, both the receiver and battery should be close to a rigid bulkhead.

Ream the holes in nylon linkage parts oversize to prevent binding. Binding results in excessive battery drain. All servo linkages should be checked for binding without the servo installed. Then install the servos and check for operation and sense (direction). Those servos which operate backwards should be turned around; never try to electrically reverse them.

No unusual techniques are employed when installing the aileron servo linkage. Each end of the output arm is linked to an aileron using 1/16 - inch diameter wire and nylon bellcranks.

TRIM ADJUSTMENT

After installing the servos, linkages, and other equipment, the exact trim adjustments can be made. The receiver and transmitter should be turned on momentarily with trim controls at neutral. This allows the servos to neutralize. Mechanically adjust the linkage so that the controls are in neutral. Now full in-flight trim in any direction is available.

Adjust the throttle control linkage so that full travel of the servo drives the throttle to both extremes. The radius of the engine throttle arm may have to be shortened to provide enough throttle throw, or lengthened to stop excessive overtravel stresses on the linkage and servo.

Run Antenna Forward Through Slit in Foam. Then Straight Up and Out Through Canopy or Top of Fuselage. Keep Clear of Receiver and Wiring

Antenna Pulled Just Tight Enough to Prevent Slack. Antenna Attached to Rubberband Which is Placed Between Fin and Rudder (Do Not Change Length of Antenna)

Keep Antenna a Minimum of 3" From Servos and Other Wiring

Adjustable Links

Switch on Side Opposite Engine Exhaust

Knot (Stress Relief)

Servos should be Loosely Mounted.

Use "G.E. Silastic" to Seal Wing and Fuselage Joint from Dirt and Oil.

Strong Bulkhead Ahead of Receiver

Nylon Arm for Nose Wheel Steering

Push Rods Should be Stiff Enough to Avoid Flexing or Whipping Under Engine Vibration and Air Loads. All Controls Should Move Freely.

Nose Gear Mounted in Nylon Blocks (Top-Flite Brand Type)

Piano Wire Push Rods Through Nylon Tubing.

Stow Plugs neatly Aft of Receiver, Keep Plugs and Wiring Clear of Receiver Case and Airframe with Foam Wrapping

COLOR CODE FOR RECEIVER PLUGS

W/BRN - RUDDER
W/RED - THROTTLE
W/OR - ELEVATOR
W/Y - AILERON

Nylon Clevis to Throttle

Wrap Battery in Foam Rubber

Mount Receiver Loosely in Foam Rubber. Container Provided.

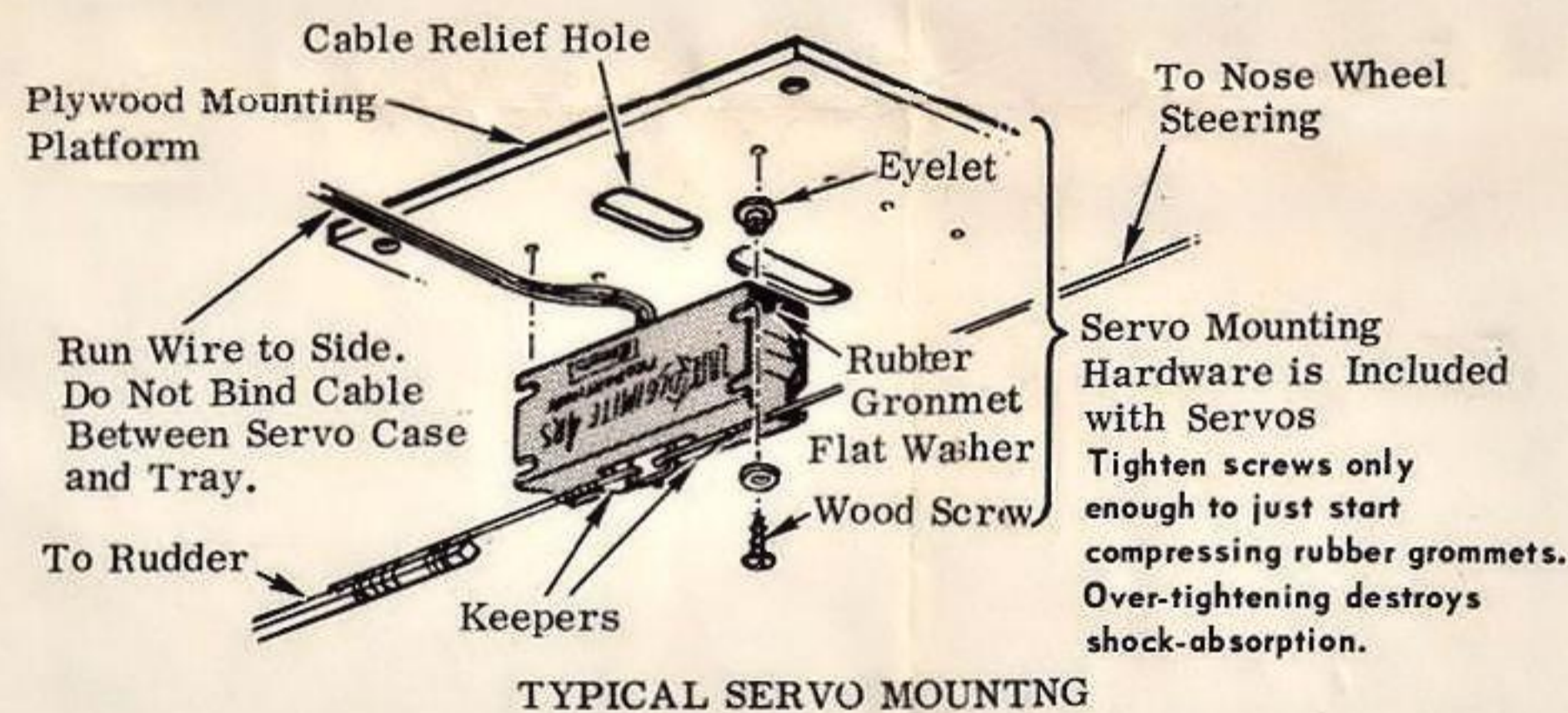
NOTE

After installing each servo, check operation with signal from transmitter. If servo operates in wrong direction, remove servo, turn it around, and reinstall. Do not attempt to reverse servos electrically.

Protect Receiver and Servos From Oil Leakage, Dust, and Dirt.

Do Not Load Servo Excessively With Mechanical Brakes (When Using Electric Brakes Make Sure Actuating Switch Does Not Generate Noise and Don't Use Receiver Batteries for Actuating Brakes)

Figure 4. Installation



VIBRATION CHECK

The final check of the system should be performed with the engine running. Note the antenna off range that can be obtained with the aircraft sitting in the position that it will be when the engine is started, then start the engine and observe control action. Back away to the antenna off range point previously noted. Run the engine through the various speed ranges. The antenna off range should not be substantially less with the engine running than it was before. If it is, you can be sure that something in your installation is causing excessive noise with vibration. A recheck should be made.

FLYING

Perform a routine control test with transmitter antenna off upon arriving at the flying field each day. Although RF activity at the field may reduce the range previously attained with antenna removed, the results of this test are indicative of whether or not a major problem exists.

A qualified proportional flyer should test fly the aircraft and trim it in the air using the trim levers. After the flight, mechanical trim adjustments should be made to the airplane linkage so that the transmitter trim levers may be returned to neutral.

Lack of sufficient charging of batteries is one of the greater problems affecting reliability. Whenever possible, charge the batteries for 12 to 15 hours just prior to flying.

Always extend the transmitter antenna completely, prior to taxiing out for take-off. The receiver with its R.F. overload protection allows operation within an arm's length of the transmitter with antenna fully extended.

SYSTEM CHECKOUT AND OPERATION

Before installing the Digimite system in a model, it is recommended that it be put into operation on the bench to familiarize the owner with the operation. Before this is done, be sure the batteries are charged in accordance with the preceding section.

All that is needed to place the transmitter into operation is to turn the switch on. The antenna may be attached if desired and can be retained in the collapsed condition for bench work.

To operate the airborne equipment, plug the servos into the appropriate receiver sockets, connect the receiver to the battery pack using the switch and wiring harness and turn the switch on. Although the servo plugs are polarized, care should be taken in mating the servo plugs to receiver sockets. Check index marks on plugs and sockets, before connecting.

If a servo is plugged in backwards it will fail to operate. Should this occur it will not damage the equipment.

Switch the receiver on and study the control operation. Refer to figure 1. for transmitter controls.

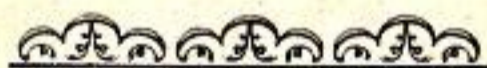
When operating trim levers, the correct method is to depress the trim lever and then move it. This unlocks levers for movement.

FACTORY SERVICE

If at any time the Bonner Digimite system fails to function properly, it should be returned to the factory for service. The components should be replaced in the original shipping carton for return. A detailed description of the problem should be included. This will greatly expedite the proper servicing of your equipment.

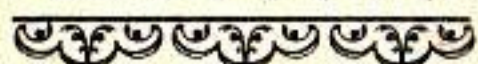
Circuit diagrams are not included with Digimite units. The computer-type logic network circuits of the Digimite system do not require checkout by, and are beyond the capability of, the normally skilled electronic technician. Circuit diagrams may be obtained from the factory for \$2.50 a set, (transmitter, receiver, and servo circuits are in one set). Be sure to include the serial numbers of your transmitter and your receiver when ordering circuit diagrams. The serial number for each set is printed next to the 110 volt charging socket on the transmitter.

We reserve the right to make improvements and modifications at any time without notice or obligation.



WARRANTY

ALL BONNER equipment is fully guaranteed against defective parts and workmanship for a period of ninety days from the date of purchase, subject to the following provisions: The guarantee is void if the subject equipment has been tampered with, altered, or shows evidence of abuse or crash damage; crystals are not guaranteed against breakage. Any abuse or tampering of this set, including the wiring will void the warranty. When returning equipment for repair, include the receiver batteries to enable us to determine cause of failure. All repairs are returned C. O. D. or CASH IN ADVANCE.



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