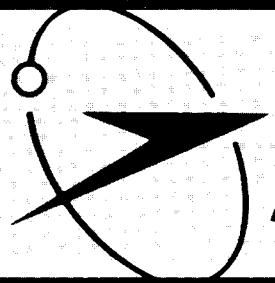
Module Series
R/C Systems



AIRTRONICS®

Module Series
R/C Systems

THANK YOU FOR SELECTING AIRTRONICS

We appreciate your purchase of this new Airtronics Module Seven-Channel Radio Control System. These instructions are intended to acquaint you with the many unique features of this modern, state-of-the-art equipment. Please read them carefully so that you may obtain maximum success and enjoyment from its operation.

We ask that you pay particular attention to the design of the transmitter. Notice that it has been human engineered for the most natural and precise control of your choice of flying models. Rather than design a single transmitter overloaded with the many functions required to adequately control every type of model flying, with the resulting confusion and compromises, we at Airtronics elected to bring you your choice of four transmitters. Though they share the basic flight-proven Module design and features, they have been optimized for only one type of model flying: (1) Module 7P for fixed wing power airplanes; (2) Module 7SP for sport and competition aircraft; (3) Module 7H for sport and competition helicopters; and (4) Module 7HI which includes those functions and controls required for inverted helicopter flight. Within this manual you will find a section devoted exclusively to the Module System of your choice, as well as general information which applies to all of them. Isn't it nice to know that you will be flying with a system with no built in compromises, designed for YOUR type of flying?

SAFETY

Radio Control modeling is one of the most enjoyable and rewarding hobbies available today. However, the rewards and satisfaction are greatly increased if the R/C'er keeps safety in mind at all times when he is operating his models. You must never forget that you are responsible for the safety of not only yourself but those spectators and other flyers that are nearby whenever you operate your R/C model. This is not a responsibility that should ever be taken lightly.

The instructions and installation guidelines presented in this manual should be followed at all times. Deviating from these recommended practices could create an unsafe condition and cause your model to not respond properly to your commands. Especially if you are new to the hobby, it is best to ask the advice of an experienced modeler who can check your radio installation. Even for the relatively well experienced R/C'er, a thorough pre-flight by a fellow flyer is always a good idea as often he will spot an installation or construction detail that has previously gone unnoticed.

Obtaining an experienced flyer's help is even more important in the beginning of your career as an R/C pilot. He should help you test fly your aircraft and advise you if the control response is correct and adequate and help you make any necessary adjustments for perfect and safe flight.

ACADEMY OF MODEL AERONAUTICS (AMA)

The AMA is the chief regulating body for model aviation in the United States, and is a functioning member of the Federation Aeronautique Internationale. It establishes the rules under which we modelers fly and compete, as well as providing valuable services for model clubs and individual modelers. We urge you to consider joining the AMA to help support the sport of radio control flying, and also to be eligible for some important benefits and insurance protection. When you have advanced to competition flying, even for low key fun-fly's, AMA membership is mandatory and enforced.

An important function of the AMA has been the development of flying safety rules and regulations by which most R/C flying sites operate. Membership in the AMA includes a subscription to an informative monthly publication, Model Aviation; special discount offers; and other attractive benefits. For further information about AMA membership and programs, please write to the following address:

ACADEMY OF MODEL AERONAUTICS
1810 Samuel Morse Dr.
Reston, VA 22090 (703) 435-0750

SYSTEM FEATURES

TRANSMITTER

- High power (500 MW) RF module frequency control
- Advanced gimbal design with individual control stick length and tension adjustments
- Finely ratcheted trims for accurate adjustments
- High visibility wide-face meter for precise monitoring of battery voltage and condition
- Individually adjustable dual rates on primary flight controls. Flashing LED's indicate "Low"
- Front panel mounted LCD digital timer accurately indicates time of day or elapsed time (stopwatch)
- Servo reversing available on all seven channels
- Individual servo travel adjustments possible on each side of the three primary flight channels
- Travel adjustment possible on high side of throttle channel, external trim only at low throttle position, for precise power settings (7P only)
- Special functions, such as retract gear, mixers, coupling, snap rolls, special helicopter requirements including inverted flight are available on specific types of transmitters
- Rapid plug-in battery changes when necessary for extended operating time requirements
- Attractive brushed chrome, black plastic case with internally collapsible ten-section antenna

RECEIVER

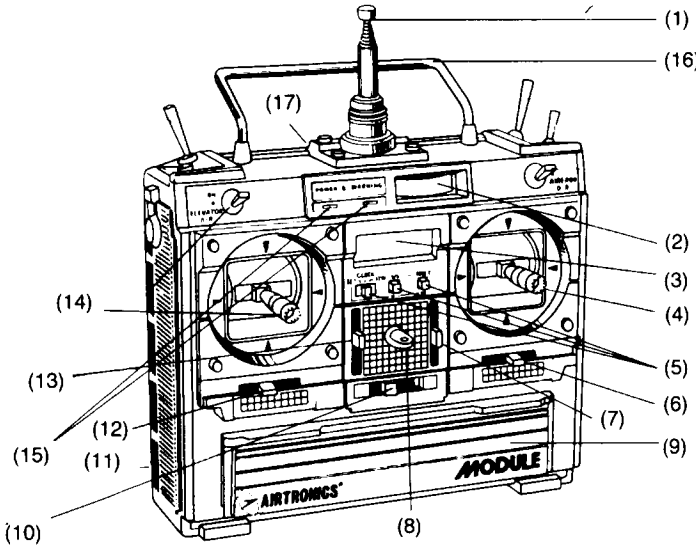
- Dual Conversion Narrow Band Frequency Modulation utilizing latest circuitry and components
- 20 KHz adjacent channel spacing capability for superior noise and interference rejection
- Compact size, only 2-11/16 x 15/16 x 13/16"
- Light weight, only 1.7 ounces including crystal
- Gold plated connectors used throughout
- Plug-in crystal for rapid frequency changes

SERVOS

Airtronics Module 7 available with different servos with different specifications for specific purposes

- 94401 (7SP) Ball Bearing Micro. 32.5 Oz. In. torque; 0.95 Oz. weight; 1.22 x 0.59 x 1.22"; 0.5 Sec. transit time for 90 degree travel
- 94510 (7SP-Q w/ 1.2 A battery for Quarter Scale) Coreless Waterproof. 100 Oz. In. Torque; 2.5 Oz. weight; 1.87 x 0.90 x 1.54"; .5 sec travel
- 94551 (All) Ball Bearing Standard. 47.5 Oz. In. torque; 1.87 Oz. weight; 1.46 x 0.75 x 1.44"; 0.5 Sec. transit time for 90 degree travel
- 94554 (All) Coreless Ball Bearing. 73.5 Oz. In. torque; 2.08 Oz. weight; 1.46 x 0.75 x 1.44"; 0.4 Sec. transit time for 90 degree travel
- 94631 (All) High Speed Standard. 48 Oz. In. Torque; 1.8 Oz. weight; 1.54 x 0.70 x 1.59"; 0.3 Sec transit time for 90 degree travel

BASIC TRANSMITTER FEATURES AND FUNCTIONS



These basic features and functions are alike on all models of the Airtronics Module 7 transmitters. The special operational features are described and explained separately for each type.

1. Retractable Antenna
2. Power Meter
3. Digital LCD Timer
4. Control Stick. Horizontal Aileron, Vertical Throttle (Mode One), Elevator (Mode Two)
5. Timer Control Switches
6. Trim Lever, Aileron
7. Trim Lever, Throttle (Mode One), Elevator (Mode Two)
8. Neck Strap Connecting Hook
9. Trimmer Cover
10. Power Switch
11. Charging Jack (Rear)
12. Trim Lever, Rudder
13. Trim Lever, Elevator (Mode One), Throttle (Mode Two)
14. Control Stick, Horizontal Rudder, Vertical Elevator (Mode One), Throttle (Mode Two)
15. Power and Warning LED Lamps
16. Carrying Handle
17. Frequency Module (Rear)

BASIC TRANSMITTER OPERATION

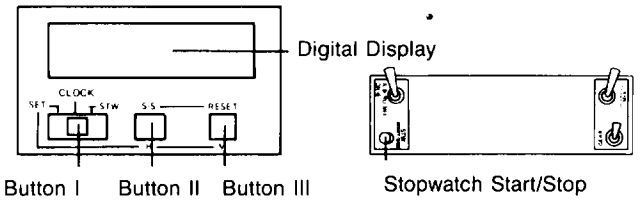
All of the Airtronics Module 7 transmitters regardless of type and intended use may be operated as a basic five channel system by disabling or zeroing all of the special functions. That is, they may be used for normal Aileron, Rudder, Elevator, Throttle and Retract Gear flying of any type of model. This section of your Airtronics manual covers those basic channels and features of your Module 7 that are similar on all transmitters. The numbers indicated are the identifying numbers to be found on the transmitter sketches throughout the manual.

2. The Power Meter displays an indication of the transmitter's output; the result of battery charge and condition. A freshly charged battery will cause a reading in the silver portion of the meter face. A reading in the center orange portion indicates a marginally discharged battery; while a reading in the red portion indicates a battery discharge below an acceptable level. Readings below orange just after battery charge are signs of defective cells.

6, 7, 12, 13. The Trim Levers are placed adjacent to the control they affect, regardless of Mode type being flown. The main control causes 90 degree rotation of the servo, the trim moves it 25 degrees.

15. The Power and Warning LED Lamps provide two useful functions. They will both be lighted upon actuation of the Power Switch to indicate a normal condition. Further, when the Dual Rate Switches are placed on the "ON" (Low Rate) position, the LED's will blink. The left LED will blink with Elevator low rate, the right one will do so with Ailerons.

DIGITAL LCD TIMER



3. The Digital LCD Timer can be used to provide various types of useful information. It maintains accurate time of day or it can provide elapsed time or similarly, stopwatch functions. Time of day is displayed in the international 24 hour clock; 1:00 PM is shown as 13:00, 2:00 PM as 14:00, etc.

Button I determines Timer operation. In the "SET" position, the correct time of day can be entered, using Button II to advance to the current hour and Button III to do so to the correct minute. With Button I now placed in the center or "CLOCK" position, it will display the time of day only, all of the other buttons are completely ineffective.

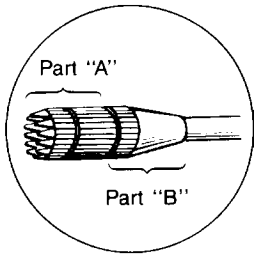
With Button I in the "STW" (Stopwatch) position, the timer will read elapsed time in minutes and seconds. Button III can be used to zero or reset the time, while Button II can be used to start or stop the time count. The Module 7SP transmitter has an additional button on the top left side of the case that functions similar to Button II.

After using the Timer as a stopwatch, the correct time will again be shown in the "CLOCK" position.

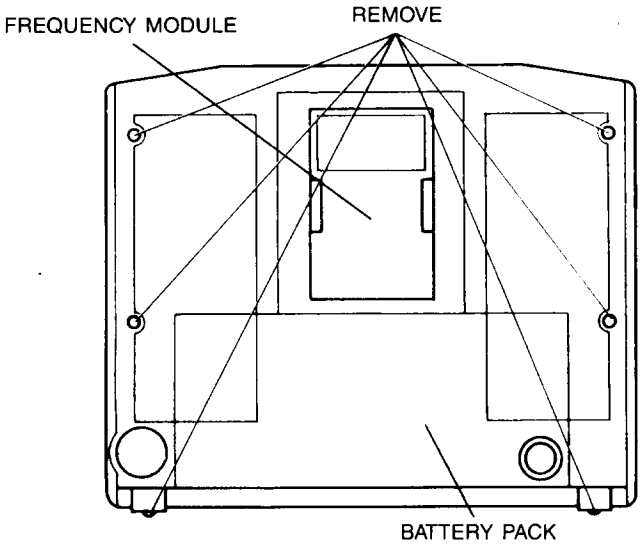
CONTROL STICK LENGTH AND TENSION ADJUSTMENT

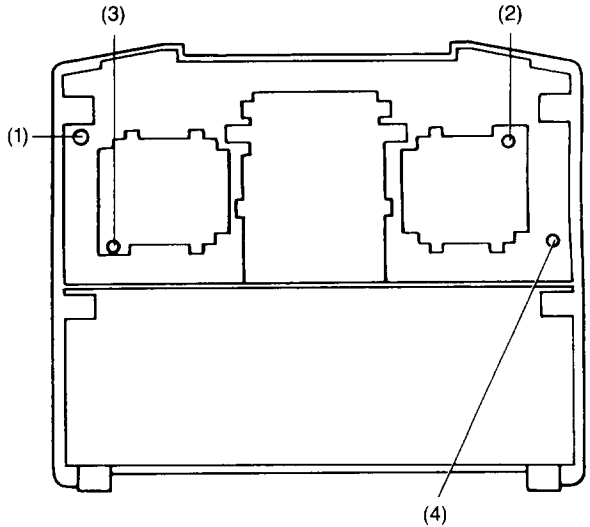
The length and spring tension of the control sticks (4) and (14) can both be adjusted as required by the individual flyer. Both procedures are simple.

To adjust the spring tension, first remove the frequency module and battery pack as described. Then, remove the six rear cover screws as indicated on the sketch below. The rear cover can now be lifted off. Three of the four screws indicated on the right hand sketch will now be visible. They control stick tension as follows: (1) Elevator Mode Two; (2) Rudder; (3) Aileron; (4) Elevator Mode One. Adjust the screw in for more tension.



Adjusting the control stick length is even easier. To do so, hold Part B with the fingers and unscrew Part A counterclockwise to loosen the two pieces. Now screw Part A in or out to the desired position, and lock it in place by screwing Part B against it. It is recommended that at least four threads be left inside Part A at its longest length for best mechanical security. Do not overtighten!





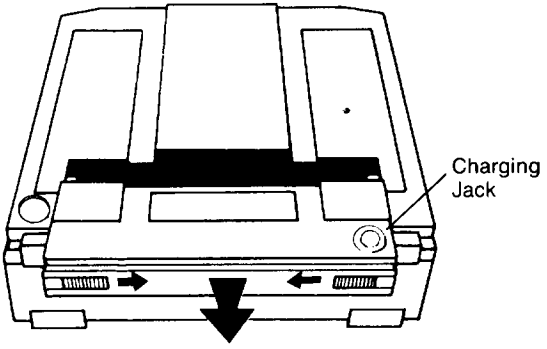
BATTERY CHARGING AND REPLACEMENT

Your Airtronics Module 7 System is equipped with the highest quality Nickel-Cadmium rechargeable batteries available. They should give you proper and dependable power for years, however they will require correct charging and handling. A dual charger, equipped with foolproof polarized connectors is furnished, we recommend its use exclusively.

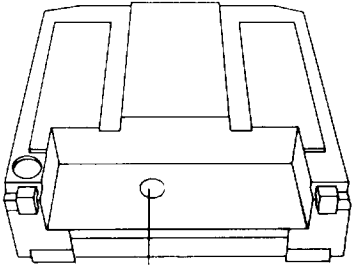
The transmitter is charged through a connector (11) on the rear right side. The receiver is charged through an extra connector attached to the switch harness. Both transmitter and receiver switches must be "OFF" for charging to take place. When properly connected, the LED's on the charger will be lighted indicating proper charging current.

Initially, both batteries should be charged for a period of 24 hours. Subsequent charging periods should run 10 - 12 hours. It is recommended that charging take place on the day or night before a flying period. Similarly, if the equipment is to be stored for a long period to time, it should be charged prior to storage, and recharged for 5 - 6 hour periods at least once every month.

Operating time for the transmitter can be expected to be about three hours. The critical operating time is that of the airborne equipment which can not be calculated exactly as it is affected by the number of servos in use, the type of aircraft, flying characteristics of the machine and the pilot and even by the type of equipment installation. On the average, a safe operating period of 1½ hours per charge can be expected under normal conditions.



The Ni-Cd batteries in your Module 7 Transmitter are prepackaged and can be easily removed for cell replacement of entire replacement with a fully charged pack when extended operating time is required. To do so, locate the two slide catches on the base of the transmitter and slide them inwards. Push the battery holder straight down and away from the transmitter. Do not pull up on it until it clears the connector on the right side of the case. Reverse procedure to replace.



The Timer battery is located under the Ni-Cd pack. Replace only with a Type LR1130 or equivalent cell.

AVAILABLE FREQUENCIES AND FREQUENCY CHANGES

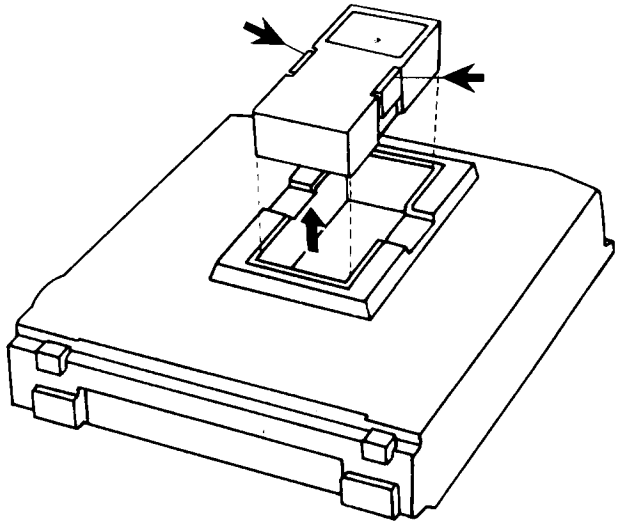
The Airtronics Module 7 Systems are available for operation on Frequency Modulation (FM) on the following 50-53 and 72 MHz frequencies. The channel numbers shown have been established for identification

50 - 53 MHz	72 MHz
50.800 RC00	72.030 RC12
50.840 RC02	72.550 RC38
50.880 RC04	72.590 RC40
50.920 RC06	72.630 RC42
50.960 RC08	72.670 RC44
53.100	72.710 RC46
53.200	72.750 RC48
53.300	72.790 RC50
53.400	72.830 RC52
53.500	72.870 RC54
53.600	72.910 RC56
53.700	
53.800	

Additional 72 MHz frequencies are scheduled to be available in 1988 and again in 1991. They will be added to the above list as soon as they are legal.

Band and frequency changes to the transmitter are made by changing the rear mounted plug-in module (17). Frequency changes to the receiver are made by changing the plug-in crystal, however, band changes to the receiver are not possible, even at our Service Center. Therefore a complete system band change will require a new receiver on the new band.

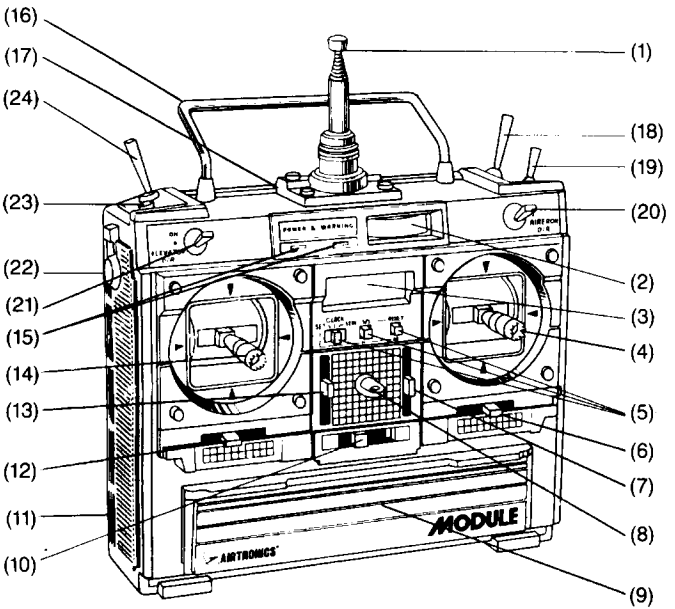
Frequency flags in the recommended colors and styles are available from Airtronics Customer Service.



Changing the Airtronics Module 7 Transmitter frequency module is rapidly and easily done. Simply press in on the two module locking tabs and lift it out. Be sure to remove it straight up, always parallel to the transmitter case to prevent bending the multi-connector pins on the lower side. To replace the new module, drop it in place, again parallel to the case, and press it into position.

Obviously, a change in the receiver's frequency must also be made whenever the transmitter module is changed. Also, be sure to install the proper color coded frequency flag on your transmitter immediately to prevent any conflict or confusion to your fellow R/C'ers at the flying field.

MODULE 7P TRANSMITTER FEATURES AND FUNCTIONS



18, 24, 23 & 19 ARE REVERSED ON ACTUAL TX

The Airtronics Module 7 Transmitter is intended for flying normally equipped fixed wing airplanes.

1. Retractable Antenna
2. Power Meter
3. Digital LCD Timer
4. Control Stick. Horizontal Ailerons, Vertical Throttle (Mode One), Elevator (Mode Two)
5. Timer Control Switches
6. Trim Lever, Ailerons
7. Trim Lever, Throttle (Mode One), Elevator (Mode Two)
8. Neck Strap Connecting Hook
9. Trimmer Cover
10. Power Switch
11. Charging Jack (Rear)
12. Trim Lever, Rudder
13. Trim Lever, Elevator (Mode One), Throttle (Mode Two)
14. Control Stick, Horizontal Rudder, Vertical Elevator (Mode One), Throttle (Mode Two)
15. Power and Warning Lamps
16. Carrying Handle
17. Frequency Module (Rear)
18. Flap Mixing Switch
19. Retract Gear Switch
20. Ailerons Dual Rate Switch
21. Elevator Dual Rate Switch
22. Auxiliary Channel Lever
23. Snap Roll Button
24. Snap Roll Up/Down Selector Switch

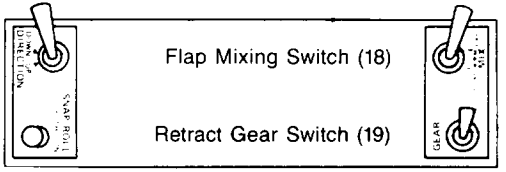
BASIC MODULE 7P TRANSMITTER OPERATION

As stated previously, the Module 7P system, like all of the Module systems, can be used as a basic R/C system without applying any of the special functions possible. Please refer to the receiver installation section for information as to servo connections and aircraft control application.

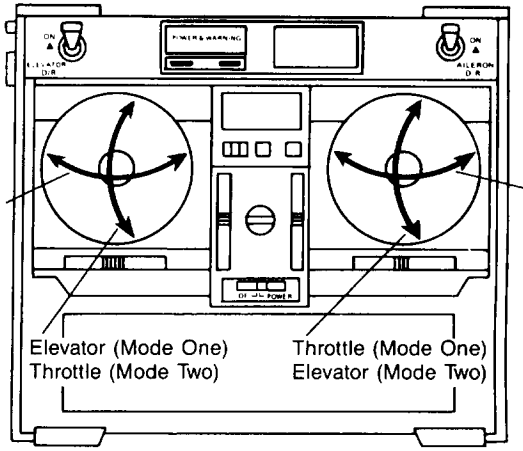
To use the system in this method, swing down and open the Trimmer Cover (9) to expose all of the various adjustments. Rotate all of the trimmers to the positions shown on the lower right hand sketch. A small screwdriver should be used to turn them. Notice that all trimmers operate ½ turn (180°).

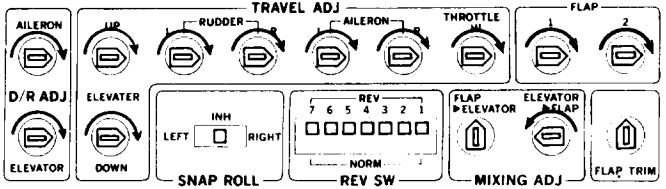
This is also a good time to familiarize yourself with the operation of the entire system. Try the Dual Rates (20) (21); notice that the trimmer action lessens servo rotation down to as little as 25 of its total 90 degree movement. Notice also that flap servo rotation is less than that of the other channels, about 50 degrees. The reason is that only limited servo rotation is required for proper control of the flaps on the average model plane.

The Module 7P Transmitters have some very useful features for setting up the necessary engine throttle operation. To begin with, adjust the mechanical linkage with the throttle stick and trim at full idle, and the throttle closed. Move the throttle stick to high, and using the "THROTTLE HI" trimmer, adjust the throttle to its fully open position. The normal Throttle Trim Lever, (7) (13) is used to adjust the idle position of the throttle.



Auxiliary Channel Lever (22)

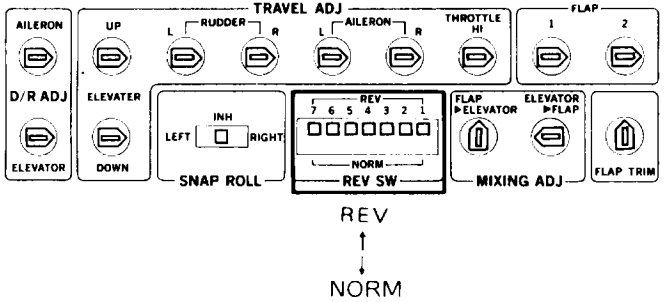




SERVO REVERSE AND TRAVEL ADJUSTMENTS

Like all of the Module 7 transmitters, the Module 7P is equipped with Servo Reversing Switches on all of its seven channels. This simplifies the installation of the equipment in the model as you do not have to be concerned about the movement of the controls in the proper direction but only in their most efficient hookup. After that is done, simply move the "REV SW" for control operation as necessary. None of the other functions are affected.

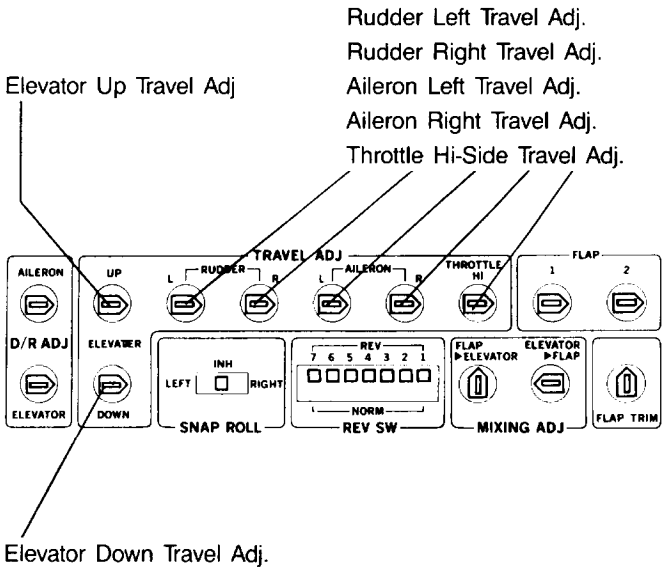
After setting the controls to operate in the right direction, it is equally simple to set them to do so the correct amount. This is done with the servo "TRAVEL ADJ" trimmers which can reduce the normal 90 degree servo rotation to as little as 40 degrees. An equal amount of lessened servo action will also take place in the low position of the Dual Rates.



Numbered Servo Reverse Switches operate as follows:

1 – Throttle
2 – Aileron
3 – Elevator
4 – Rudder
5 – Retract Gear
6 – Flaps
7 – Auxiliary

Note: On Mode One systems, 1 & 3 may be reversed!



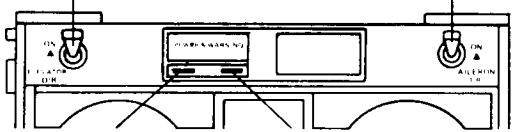
THE DUAL RATE FUNCTION

The Module 7P Transmitter is equipped with Dual Rate Functions on the Ailerons (20) and Elevator (21) Channels. The amount of normal control action to a maximum of 90 degrees of servo rotation is set with the "TRAVEL ADJ" trimmers. Placing the Dual Rate Switches (20) (21) in the "ON" or Low position can reduce this action to as little as 40 percent. This Low Rate setting is controlled by the position of the "D/R" ADJ trimmers on the panel. When either Dual Rate Switch is in the "ON" position the appropriate Dual Rate LED Lamp (15) will be on.

The use of Low Rate on these primary flight controls will generally help in flying smoother manuevers.

Elevator Dual Rate Switch (21)

Aileron Dual Rate Switch (22)

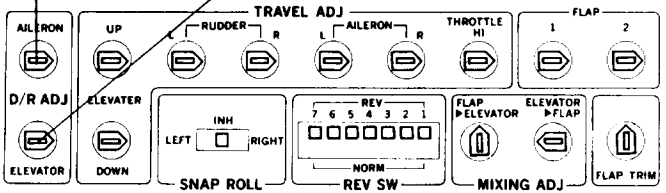


Elevator Dual Rate LED (15)

Aileron Dual Rate LED (15)

Aileron Dual Rate Trimmer

Elevator Dual Rate Trimmer

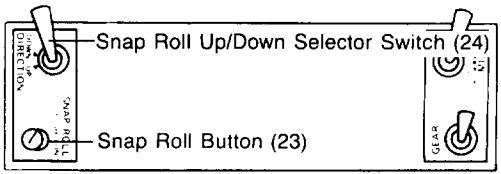


THE SNAP ROLL FUNCTION

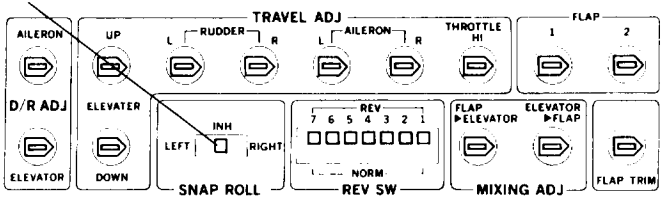
The use of the Snap Roll Button (23) assures you of perfectly executed snap rolls every time. By selecting the proper position of the Snap Roll Up/Down Selector Switch (24), you can select the type of snap roll desired. For safety reasons, the snap roll function can be completely disabled by placing the "SNAP ROLL" switch in the "INH" position.

Snap Roll R/L Changing Switch

Snap Roll / Travel	Aileron	Elevater	Rudder
Right Up Snap Roll	Right	Up	Right
Right Down Snap Roll	Right	Down	Left
Left Up Snap Roll	Left	Up	Left
Left Down Snap Roll	Left	Down	Right



Snap Roll Left/Right Switch



ON 7P - 7TH CH IS CONTROLLED BY AUX POT ON LEFT SIDE OF TX. IT DOESN'T CONTROL FLAPS:

THE FLAPS AND FLAPS MIXING FUNCTION

The Module 7P Transmitter provides for three types of Flap action, as determined by the setting of the Flap Mixing Switch (18). One moves the flaps upon movement of the Elevator stick, the other two adjust the Elevator upon movement of the Flap Mixing Switch. Please study this action carefully.

(1) With the Flap Mixing Switch in the rear (E→F) position, the Flaps are linked to the Elevator control. The amount of Flap to Elevator movement is set by the "FLAP/ELEVATOR MIXING ADJ" located on the trimmer panel. Any desired amount of flap movement from 1 to 100 percent can be set, increasing as the trimmer is rotated in a clockwise direction.

(2) With the Flap Mixing Switch in the center (F_1→E) position, the Flaps will move as far as the amount preset with the "FLAP #1" adjustment trimmer, and mixing will occur from the Flaps to the Elevator. The amount of Elevator travel is set with the "FLAP/ELEVATOR" trimmer, with maximum travel taking place with the trimmer in the full counter clockwise direction. Notice that this is the reverse of the most common trimmer action which increases CW.

(3) With the Flap Mixing Switch in the forward (F_2→E) position, the Flaps will move as far as the amount preset with the "FLAP #2" adjustment trimmer, and mixing will again occur from the Flaps to the Elevator. This action is similar to that above, but allows the pilot a choice of Flap positions. Similarly, the amount of Elevator control movement is set with the "FLAP/ELEVATOR" trimmer as before.

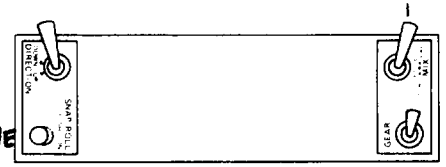
In both the F_1 - E and F_2 - E positions of the Flap Mixing Switch, and with the "FLAP/ELEVATOR MIXING ADJ" trimmer in the center, the Flap to Elevator mixing action is zero. Mixing is applied in the UP direction by rotating the trimmer to the right, and in the Down direction upon left hand rotation.

← FLAPS MOVE W/ EL STICK MOVEMENT A LA U-CONTROL ~~BUT ONLY IN ONE DIRECTION~~

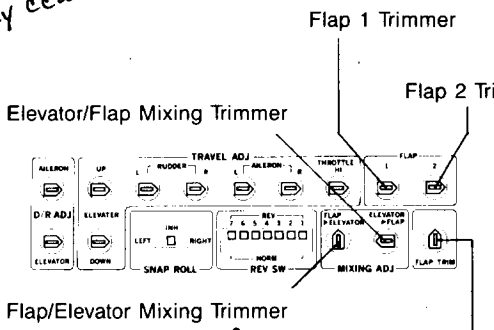
FLAP

Rear: E — F
Center: F_1 — E
Forward: F_2 — E

Flap Mixing Switch (18)



CTR OF F/E TRIMMER IS "OFF" FOR ELEVATOR i.e. FULLY CCW



TO JUST GET FLAP ACTION, TURN #2 FLAP TRIMMER FULLY CCW, #1 FULLY CW, & FLAP▸TRIMMER ZEROED OUT ⓐ OPERATE FLAPS BY SW. - 45° THROW

13

FLAP 1 FULLY CCW

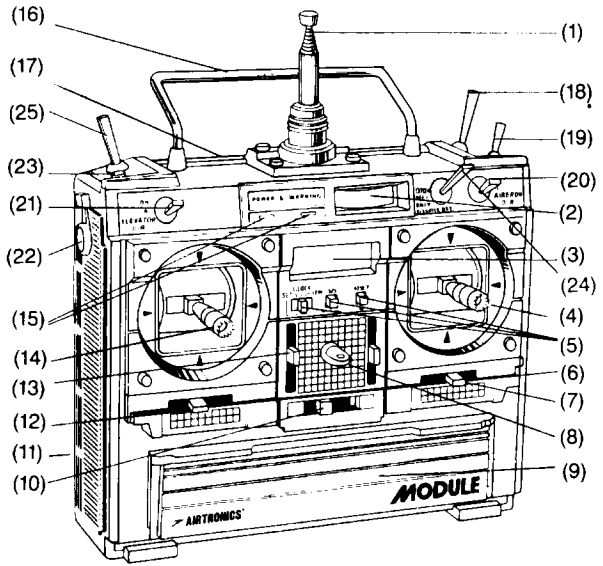
FLAP 2 FULLY CW

FLAP EL
eith CW OR CCW from CTR.

(13) FLAP SW FULLY FORWARD to middle pos

MODULE 7SP FEATURES AND FUNCTIONS

The Module 7SP Transmitter is designed for the more sophisticated types of fixed wing aircraft, such as high performance competition sailplanes which use flaps and/or spoilers, and those models controlled primarily by Vee-tails or elevons. The 7SP-Q comes equipped with high power servos and a 1200 milliamp battery, and charger, for Quarter Scale airplanes.



1. Retractable Antenna
2. Power Meter
3. Digital LCD Timer
4. Control Stick, Horizontal Ailerons, Vertical Throttle (Mode One), Elevator (Mode Two)
5. Timer Control Switches
6. Trim Lever, Ailerons
7. Trim Lever, Throttle (Mode One), Elevator (Mode Two)
8. Neck Strap Connecting Hook
9. Trimmer Cover
10. Power Switch
11. Charging Jack (Rear)
12. Trim Lever, Rudder
13. Trim Lever, Elevator (Mode One), Throttle (Mode Two)
14. Control Stick, Horizontal Rudder, Vertical Elevator (Mode One), Throttle (Mode Two)
15. Power and Warning LED Lamps
16. Carrying Handle
17. Frequency Module (Rear)
18. Flap Mixing Switch
19. Retract Gear Switch
20. Ailerons Dual Rate Switch
21. Elevator Dual Rate Switch
22. Auxiliary Channel Lever
23. Stopwatch start/stop
24. Elevator Pre-Set Trim Switch
25. Aileron/Rudder Mixer Switch

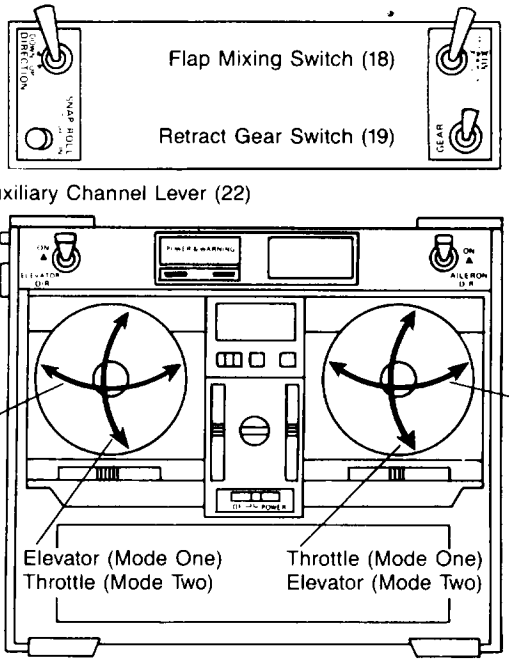
BASIC MODULE 7SP TRANSMITTER OPERATION

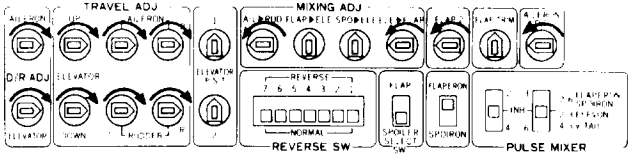
In spite of its many special features and functions the Module 7SP Transmitter is easy to set up and use in a basic configuration. Looking at the sketch on the lower right side of this page, set all of the trimmers as shown. But don't stop there, take a few minutes to familiarize yourself with all of the features and functions of this advanced radio control system and its many advantages that now permit easily made all-electronic installations.

The Module 7SP-Q System's transmitter is identical in all respects to the Module 7SP; the differences are in the airborne equipment. The Module 7SP-Q is equipped with Airtronics type 510 servos which produce a constant 100 ounce inches of torque; and high-capacity 1200 milliamp airborne batteries. Naturally, the proper charger is also included.

Except for minor differences in the location of some of the trimmers, a few of the functions of the Module 7SP are identical to those of the Module 7P. These include Servo Reversing; Servo Travel Adjustments; and Dual Rate operation. Please refer to the previous section of this manual for detailed operation of these particular Module 7 functions.

Due to the extreme control versatility of the Module 7SP System, it lends itself well to use in a wide variety of model aircraft. This versatility is increased by the proper choice of the airborne components, in particular the servos and battery. Notice that you can choose from the 510 described above, a number of standard sized servos, down to the 401 Micro, and 100 or 250 milliamp batteries.



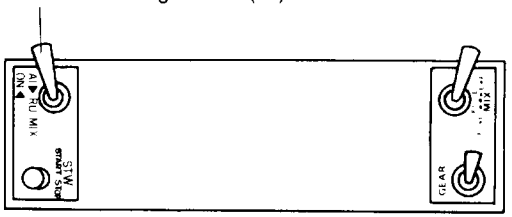


AILERON/RUDDER MIXING SYSTEM

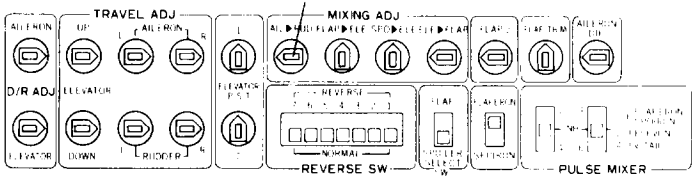
The Module 7SP transmitter provides for Aileron to Rudder Mixing, when the "AI - RU MIX" Switch (25) is in the "ON" position. This combination results in much smoother turns with some aircraft designs than are possible with Ailerons only, and also results in more consistent turns than are possible when the Aileron and Rudder mixing is done manually.

The degree of Rudder mixing is controlled from 0 to 100% with the "AIL - RUD MIXING ADJ" trimmer, which increases to maximum with clockwise rotation.

Aileron/Rudder Mixing Switch (25)



Aileron/Rudder Mixing Adjustment

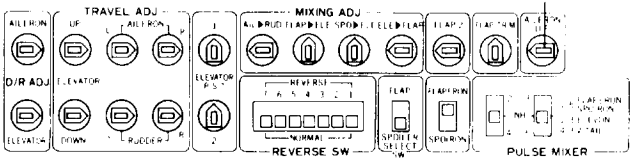


AILERON DIFFERENTIAL

The Module 7SP Transmitter provides for Differential Aileron deflection, a useful control feature which results in more realistic turns when properly used, and eliminates aileron reversal which can occur in extremes of unbalanced aileron effects.

The amount of differential is set with the "AILERON DIF" trimmer. As a rule of thumb, differential of two to one, up to down, is recommended as a start.

Aileron Deflection Trimmer

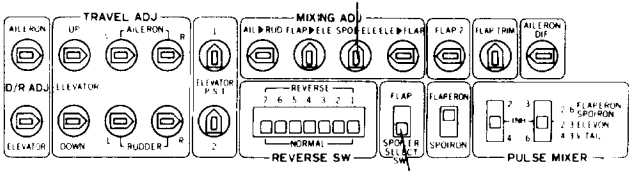


WING SPOILERS

The Module 7SP incorporates a Spoiler to ~~Aileron~~ ELEVATOR Mixing feature which can be used to cancel out any nose pitch experienced upon deployment of spoilers.

For sailplane flying, the spoilers can be operated by the Throttle Stick (4) (14) by setting the "FLAPSPOILER SELECT SW" on the trimmer panel to "SPOILER." The amount of mixing is set with the "SPO - ELE MIXING ADJ" trimmer. When near its center, mixing action is at zero. Adjust right for Up, left for Down.

Spoiler — Elevator Mixing Adjust

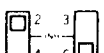
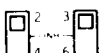
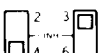


Flap — Spoiler Select Switch

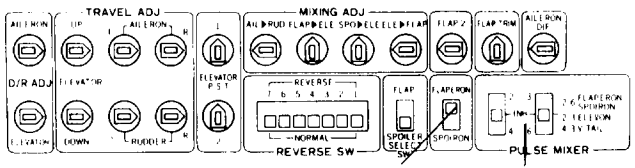
PULSE MIXER (FLAPERON, ELEVON, VEE-TAIL)

The Module 7SP Transmitter incorporates provisions for the precise operation of all of the more sophisticated aircraft control systems, such as Flaperons (Flaps/Ailerons); Elevons (Elevators/Ailerons); and Vee-Tails (Elevator/Rudder). All of these functions can be used while still retaining full use of all related controls, such as Reverse and Travel adjustments, Mixing adjustments, etc.

The sketch below indicates the proper setting of the Pulse Mixer Switches and which receiver channels must be used in what combination for each function.

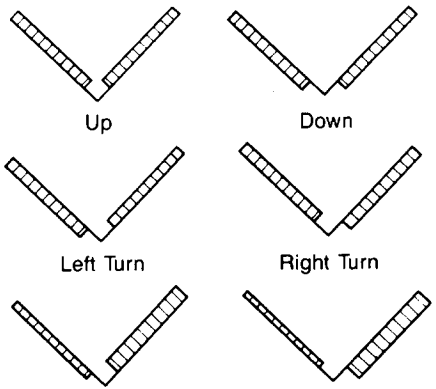
	Flaperons	Elevons	Vee-Tail	Disabled
Pulse Mixer Switch Positions				
Receiver Channels	~~2-7~~	2-3	~~3-4~~	

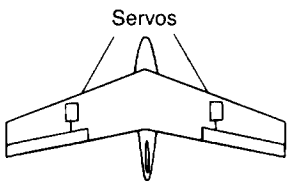
2-5 8CH RX 3-7



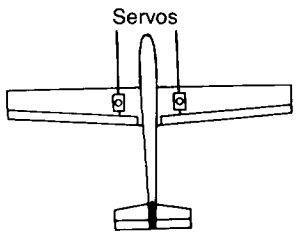
Flaperon/Spoileron Switch Pulse Mixer Switches

Vee-Tail Control Action (Seen from the Rear)





Elevon Installation



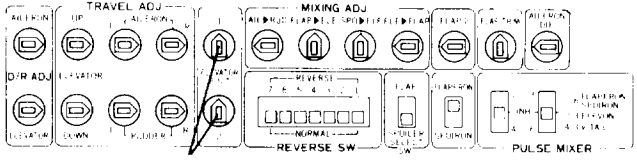
Flaperon Installation

FOR FLAPERONS FLAP-SPOILER Select SWITCH MUST be IN SPOILER position

ELEVATOR PRESET TRIM SYSTEM

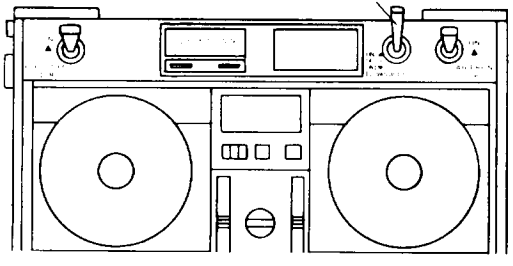
The Module 7SP Transmitter incorporates two Preset trim positions as set by the respective "ELEVATOR P.S.T." trimmers either One or Two. This allows the sailplane flyer to precisely duplicate those "P.S.T." trimmers either One or Two. This allows the sailplane flyer to precisely duplicate those trim conditions which he has found by experience to be the most effective for each flight condition, i.e., during the tow, thermaling, landing, etc.

The center position of the trimmer results in zero trim. Left gives Down trim, right gives you Up trim.



Elevator P.S.T. Trimmers

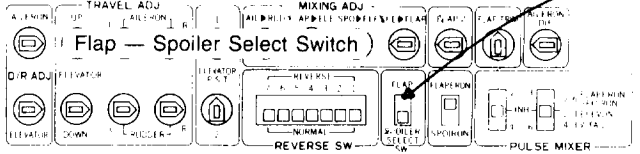
Elevator Preset Trim Switch (25)



FLAP MIXING

Flap operation of the Module 7SP Transmitter is controlled by the Flap Mixing Switch (18) and is essentially the same as that for the Module 7P. You are referred back to that section of this manual for detailed instructions on their use.

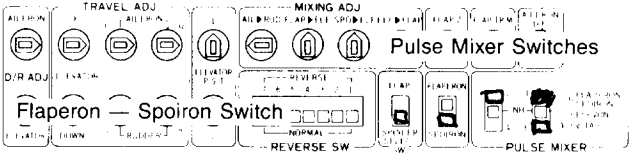
However, there is one significant difference. By placing the "FLAP-SPOILER SELECT SW" on the trimmer panel to the "FLAP" position, the throttle stick (4) (14) can be used as a Flap (Speed) control.



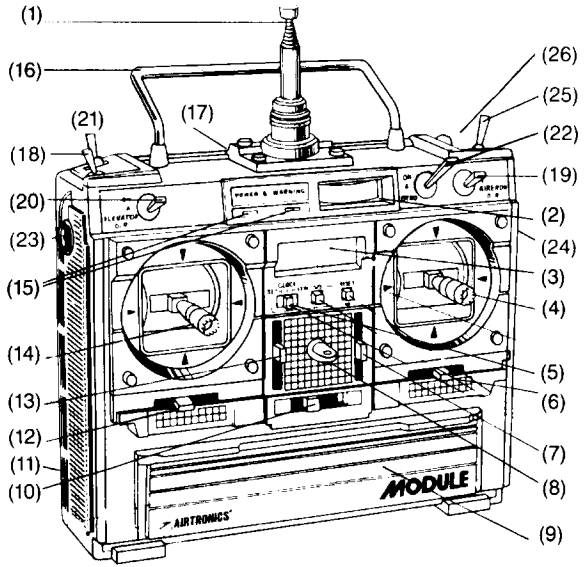
SPOILERONS

The Module 7SP Transmitter incorporates a system which allows the Ailerons to be used as Spoilers. To activate this function, set the "PULSE MIXER" switches to the "SPOIRON 2 - 6" position and the "FLAPERON - SPOIRON" switch to the "SPOIRON" setting. The respective servos should be plugged into the receivers servo outputs number 2 and 7, as shown.

If the Aileron operation is normal but the Spoiler operation is reversed, reverse the servo connections.



MODULE 7H TRANSMITTER FEATURES AND FUNCTIONS



The Airtronics Module 7H Transmitter is intended primarily for the flying of model helicopters.

1. Retractable Antenna
2. Power Meter
3. Digital LCD Timer
4. Control Stick. Horizontal Ailerons, Vertical Throttle (Mode One), Elevator (Mode Two)
5. Timer Control Switches
6. Trim Lever, Ailerons
7. Trim Lever, Throttle (Mode One), Elevator (Mode Two)
8. Neck Strap Connecting Hook
9. Trimmer Cover
10. Power Switch
11. Charging Jack (Rear)
12. Trim Lever, Rudder
13. Trim Lever, Elevator (Mode One), Throttle (Mode Two)
14. Control Stick, Horizontal Rudder, Vertical Elevator (Mode One), Throttle (Mode Two)
15. Power and Warning LED Lamps
16. Carrying Handle
17. Frequency Module (Rear)
18. Retract Gear Switch
19. Aileron Dual Rate Switch
20. Elevator Dual Rate Switch
21. Pitch Curve Select Switch
22. Gyro Control Switch
23. Pitch Trim (Side)
24. Hovering Throttle Knob
25. Idle Up Switch
26. Hovering Memory Switch

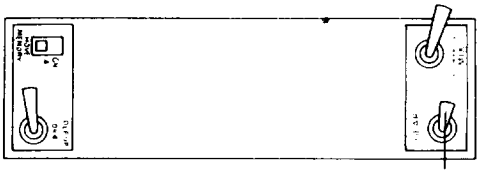
BASIC MODULE 7H TRANSMITTER OPERATIONS

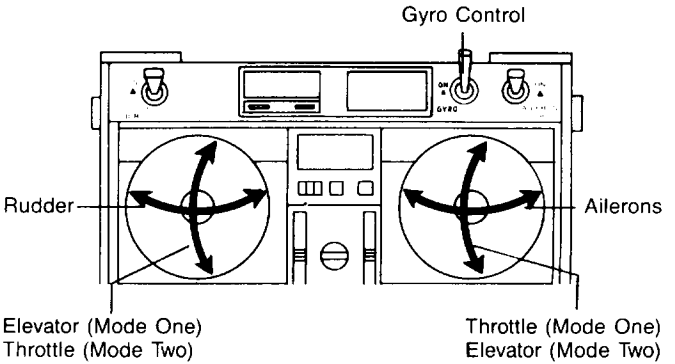
As is the case with all Module 7 Transmitters, the Module 7H can be used as a common radio control system as normally used for fixed wing models. To use it in this manner, it is only necessary to zero or disable all of the helicopter-only functions. Please refer to the sketch on the lower right.

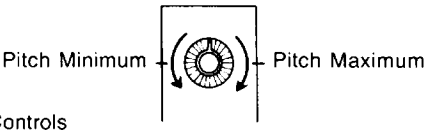
Though we realize that helicopters use different control surfaces than airplanes, i.e., the main rotor for pitch and roll instead of the elevator and ailerons, and the tail rotor for yaw instead of the airplane's rudder, it has become standard practice in R/C to refer to those transmitter controls that would create a certain action on an airplane, in the same manner, though the system is being used to fly a model helicopter. For the purpose of this manual, we are following the habit.

Except for the difference in the location of some of the trimmers, a few of the functions of the Module 7H are identical to those of the Module 7P. These include Servo Reversing, Servo Travel Adjustments, and Dual Rate Operation. Please refer to the earliest section of this manual for detailed operation of these particular Module 7 functions.

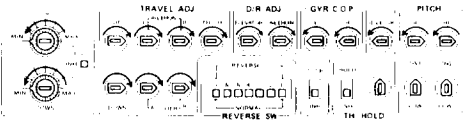
There is one helicopter function that could have an effect on the use of the transmitter in its basic form. That is the Pitch Trim (23). Normally, both pitch and throttle are operated by the main stick, though each function has its individual trim. The greatest throttle trim is achieved at the pitch trim control's low side; no operation takes place at its high side. The pitch trim controls 25% of the throw.







Set Trimmer Controls according to arrows.



RUDDER MIXING AND HOVERING MEMORY

MAXIMUM COMPENSATION IS DETERMINED BY TRIMMER SETTINGS.

As power is applied to the main rotor of the helicopter, a reverse torque is generated which causes the fuselage to rotate in the opposite direction. To counteract this torque, a certain amount of opposite rudder control must be applied as the throttle is advanced. The Module 7H does this for you automatically. There are no external controls for rudder mixing, only those "Set and Forget" trimmers under the Trimmer Cover (9) and a switch which is used to set the direction of the control to be applied or to disable the function.

The Module 7H incorporates a Hovering Memory which is used to electronically memorize the position of the stick during hovering flight and thus to simplify future hovering manuevers. These two functions work together, note that there are two trimmer settings, one for ascending and one for descending flight. Let's learn how to set them!

To use the Module 7H's Rudder Mixing and Hovering Memory Functions:

(1) In order for rudder mixing to take place, you must place throttle stick in the center or neutral position.

(2) First, viewing the helicopter from above, set the "R - INH - L" switch under the trimmer panel in the same direction as the rotation of the rotor. If the main rotor turns to the right (clockwise) set the switch to "R." If the main rotor turns to the left (counterclockwise), it should be set on "L".

(3) Set the Hovering Memory Switch (26) to "OFF" and set the Mixing Adjustment Trimmers as follows: "UP" or ascent trimmer to 70% travel (from Min to Max); the "DOWN" or descent trimmer to 50% travel (straight up). These are the beginning settings.

(4) Place the Hovering Memory Switch (26) to the "ON" position to make adjustments to the ascent and descent trimmers. Remember that "UP" adjustments will only be affected by the upper half of stick travel, and "DOWN" adjustments by the lower half of stick travel.

(5) Final setting of these controls is determined in the following manner:

With the helicopter in ascending flight, watch the action of the tail. Based on helicopters whose main rotor turns to the right (clockwise), if the tail seems to turn to the right, turn the "Up" knob a slight amount to the right. If, on the other hand, the tail seems to turn to the left, rotate the same knob a small amount to the left. Make changes slowly.

Now with the helicopter in descending flight, we will make the same adjustment to the "DOWN" trimmer. If the tail swings to the right, turn the trimmer setting slightly to the left. Conversely, if the tail turns to the left, turn it right. Easy does it!

Please pay particular attention to the fact that the trimmer correction is made opposite each other in the ascending steps just described.

Somewhat similarly, if the helicopter's main rotor rotates to the left, (counterclockwise), each of the corrections described above is made in the opposite direction. That is, for ascending flight, if the tail swings right, correct left, etc.

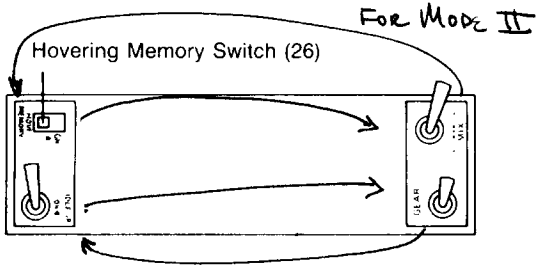
WITH TRIMMERS DIALED TO MINIMUM COMPENSATION THERE IS NO COMPENSATION FROM RUDDER STICK POSITION WITH MEMORY "ON" OR "OFF".

RUDDER MIXING AND HOVERING MEMORY

If it is necessary to reset the Memory Function or make minor adjustments, simply hover the model, turn the Hovering Memory Switch "OFF", and "ON" again.

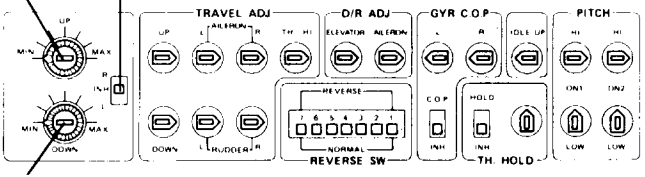
The Hovering Memory, though not the settings of the two Mixing Adjustment trimmers as described, will also be lost if the transmitter's battery is allowed to get to a completely discharged state.

For Mode II



Ascent Mixing Adjustment

Rudder Mixing L — Inhibit — R Switch



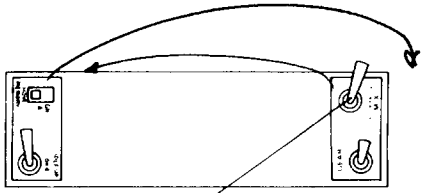
Descent Mixing Adjustment

PITCH CURVE SYSTEM

With variable pitch helicopters, it is desireable to match the engine's torque curve and the pitch curve. The Module 7H accomplishes this with it's Pitch Curve System, actuated by Selector Switch (21).

This function controls the operation of the Pitch Servo, and offers you a choice of two different settings, ON2 in the rear position of the switch and adjusted with the ON2 trimmers, and ON1, with the switch forward, and adjusted by its two trimmers. The "HI" trimmer can be set for 25% compression of full servo travel, while the "LOW" affects its travel from 25% compression to 15% expansion.

Note: Selector Switch (21) also controls the Throttle Hold function, as described in the following section.

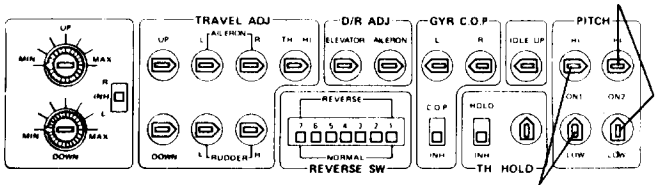


For Mode II - All are Reversed

Pitch Curve Select Switch (21)

Rear ON2 — Off — Forward ON1

ON2 Setting Trimmers



ON1 Setting Trimmers

THROTTLE HOLD

The Module 7H incorporates a Throttle Hold Function which is useful during auto rotation, to kill the engine, etc. It is activated by the Pitch Curve Select Switch (21) when placed in the ON2 position.

This feature allows you to hold the throttle in any desired position and still maintain full command of the main rotor pitch, which is done in the normal manner with the throttle stick (4) (14).

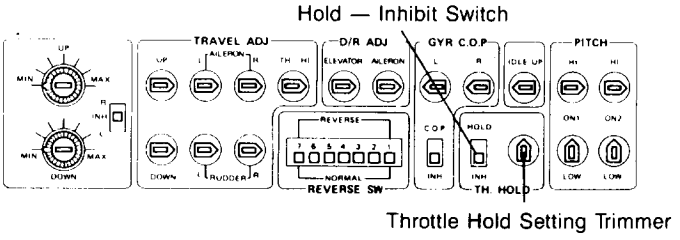
The Throttle Hold function is controlled and adjusted by the "HOLD - INH" switch and trimmer located on the trimmer panel. When the switch is placed in the "HOLD" position, and the Pitch Curve Selector Switch is placed in the rear ON2 position, the throttle servo will travel to and maintain a throttle setting as determined by the trimmer.

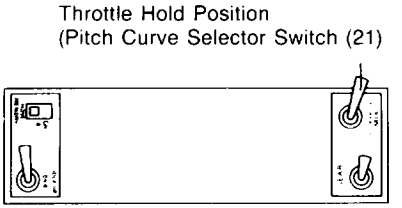
Returning the Pitch Curve Selector Switch to either the OFF or ON1 positions will return control of the throttle servo to the usual control stick.

Placing the "HOLD - INH" switch in the "INH" (Inhibit) position completely disables the Throttle Hold function. It is recommended that whenever it is not being used, the switch be maintained in the "INH" position to prevent accidental operation.

When it is desired to stop the engine for auto rotation or at the end of the flight, the Throttle Hold function can be used by adjusting the trimmer to set the throttle servo to the necessary point.

Use of the ON2 position of the Pitch Curve Select Switch in this manner overrides its use in the ON2 Pitch Curve Function. Therefore it is suggested that the ON1 position be set to the most used of the two Pitch Curve functions. By returning the "HOLD - INH" switch to the "INH" position, full use of both the ON1 and ON2 functions is restored.





THROTTLE IDLE UP

The Module 7H is equipped with a throttle "Idle Up" function which can be used to maintain the engine speed at a predetermined level while using the main throttle stick to produce low pitch conditions. This is desireable to prevent the engine from dieing during prolonged periods of low idle.

This creates some of the effect of an engine governor, and while is does not operate exactly as such a governor would, it does prevent the engine speed from dropping during acrobatics even when the throttle stick is at the lowest pitch position. We strongly recommend that the Idle Up function be used during these manuevers.

The operation of the Idle Up function is controlled by the Idle Up Switch (25) and the "IDLE UP" trimmer located on the trimmer panel. Set as follows:

(1) Initially, set the Idle Up Switch to the "OFF" (forward) position, and the "IDLE UP" trimmer fully counterclockwise, to its minimum idle position.

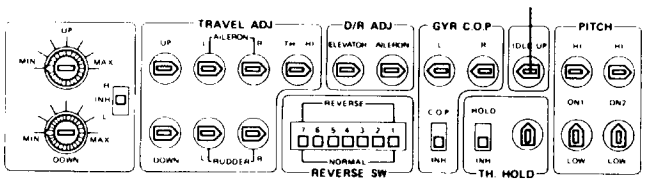
(2) Start the engine, and set the Throttle Control Stick (4) (14) to its normally lowest position. Now set the Idle Up Switch to the "ON" (rear) position, and gradually rotate the "IDLE UP" trimmer clockwise raising the engine speed to about the same as is usually required during normal hovering manuevers.

(3) Fly the helicopter without the Idle Up function during takeoff, and try the Idle Up at a known safe altitude. Make minor "IDLE UP" trimmer adjustments as necessary to maintain the proper relationship between the in-flight engine speed and the pitch.

Due to the many variations in R/C helicopter design and flight characteristics, it is difficult to list the exact adjustments necessary to the helicopter transmitter. This is one of the many examples.

And as in the case with all but the very basic flight control functions, the final settings to many of the 7H transmitter functions can only be found by trial and error, while in flight!

Idle Up Trimmer

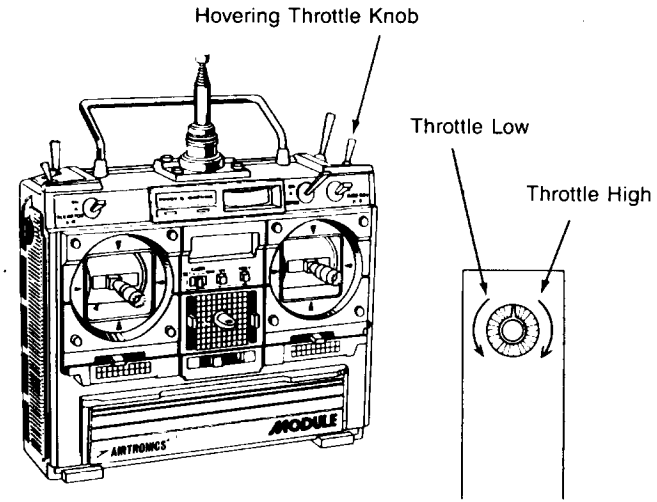


Idle Up Switch (25)

THE HOVERING THROTTLE

The Module 7H transmitter has a Hovering Throttle function designed to produce the best possible engine speed and rotor pitch for this critical manuever. It is operated by the Hovering Throttle Knob (24). This function controls the throttle servo for about 25% of its normal rotation. This is independent of the setting of the Pitch Trim (23).

For best results, it is recommended that the throttle linkage be installed so as to hold the throttle half open with the Throttle Control Stick (4) (14) and the Hovering Throttle Knob both also being at the mid-point position of their travel.



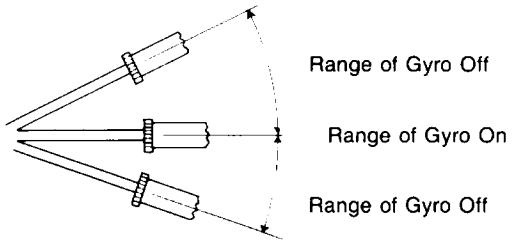
USING THE GYRO SYSTEM

Gyro systems for R/C model helicopters and the transmitters they are flown with have to be designed to work with each other in order to make full use of the best features of both. The Airtronics 96202 Gyro System is designed to take full advantage of the features of the Module 7H and vice versa, and is therefore highly recommended for use with it.

The Module 7H provides for two independent control methods for the gyro. (1) It can be turned ON or OFF with the Gyro Control Switch (22) or (2) it can be controlled by the position of the Rudder Stick (4) (14). We recommend that you try both methods.

To control the gyro with the Gyro Control Switch, set the gyro "C.O.P. (Center On Position) - INH" switch to "INH". The gyro will now be operated solely by the position of the Gyro Control Switch.

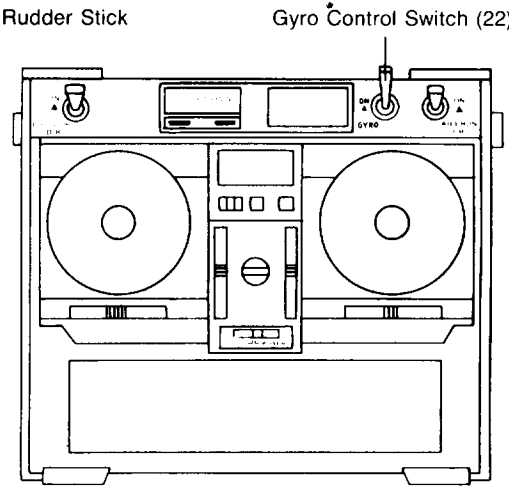
To use the Rudder Stick Gyro Control function, set the "C.O.P. - INH" switch to the "C.O.P." setting. Gyro control is now determined by the position of the rudder stick; when the stick is at neutral, the gyro is operational and controlling the rudder. When the stick is moved off center, it turns the gyro OFF and the stick now has primary control.

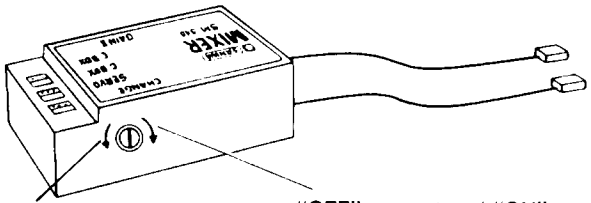


USING THE GYRO SYSTEM

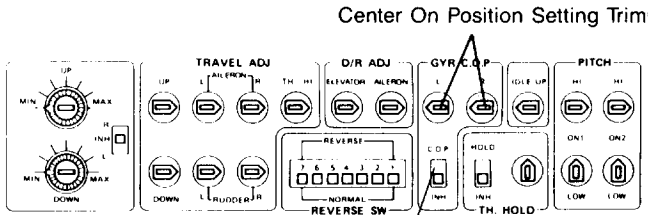
The position at which the stick affects the rudder control is adjusted by the "GYRO C.O.P." trimmers on the trimmer panel. They provide independent adjustment to both sides of the stick neutral. When the trimmer is adjusted clockwise, the gyro ON range becomes narrower and the gyro OFF range becomes wider. The settings of these trimmers is determined by the type of helicopter being flown and the pilot's experience, however, a rule of thumb for the beginner is more servo authority.

If the gyro ON range does not become acceptably narrow with the C.O.P. trimmer fully clockwise, locate the trimmer on the side of the Gyro Mixer, and adjust it counterclockwise. Again, go slow! If the gyro's OFF condition or ON range is not sufficient, adjust this trimmer slightly clockwise.

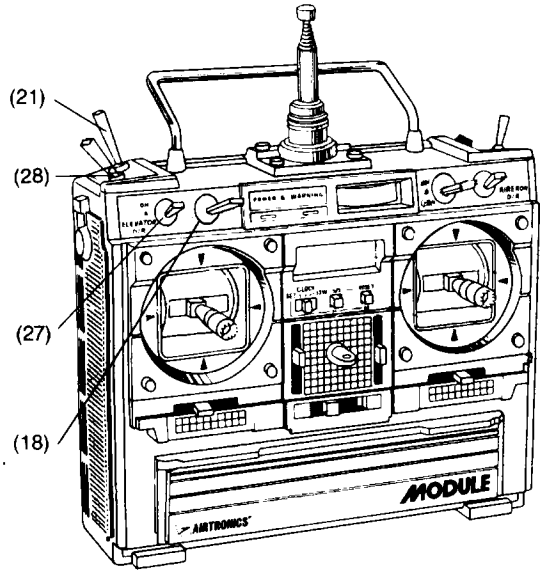




GYRO AMPLIFIER



MODULE 7HI TRANSMITTER FEATURES AND FUNCTIONS



The Module 7HI transmitter is designed for the R/C model helicopter expert pilot; it includes those features necessary for the epitome of model helicopter flying, inverted flying and manuevering.

Except for the above, the Module 7HI is closely similar to the Module 7H, with the following minor exceptions:

The Hovering Throttle Knob (24) has been deleted.

The Retract Gear Switch (18) has been repositioned from the top of the transmitter to the left front panel, see the sketch left.

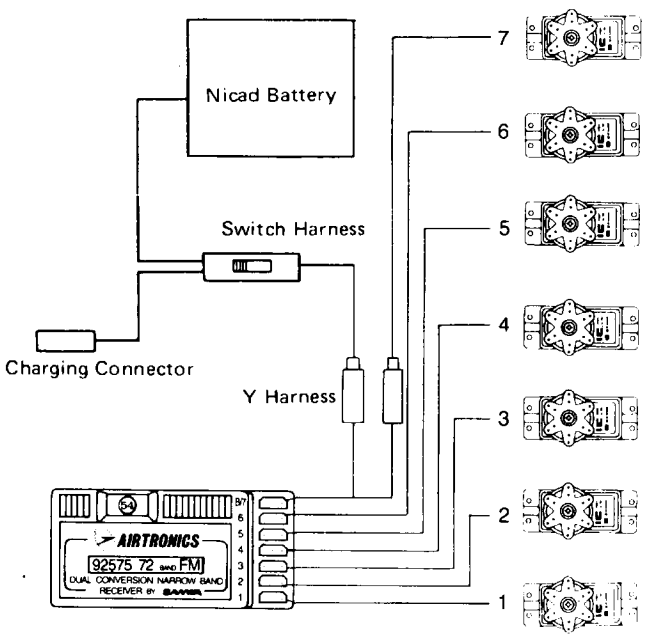
The Pitch Curve Select Switch (21) has only one "ON" position instead of two as does the 7H.

The Inverted Flight Switch (28) has been added to the top left of the case.

The throttle hold switch (27) has been added to the left front panel.

Upon activation of the Inverted Flight Switch, the movement of the main rotor pitch, the rudder, and the elevator servos is reversed. There will be no change in the center position of these servos. Thus, even with the helicopter in an inverted position, the control stick inputs necessary to manuever it in any desired manner remain exactly the same.

CONNECTING THE MODULE 7 RECEIVER



The servo and battery connections for the fixed wing (7P, 7SP, 7SP-Q) and rotary wing (7H, 7HI) Module Systems are basically the same. The only differences are in the application of the servos to the control surfaces of the models.

The channel number and servo connections for the fixed wing aircraft are as follows:

1 – Throttle
2 – Aileron
3 – Elevator
4 – Rudder
5 – Retract Gear
6 – Flap
7 – Auxiliary

(7SP HAS 7TH CHANNEL OUTPUT FROM AIL. CH)

(ONLY 7P HAS ACTUAL AUX 7TH CH)

The channel number and servo connections for the rotary wing aircraft are as follows:

1 – Throttle
2 – Aileron
3 – Elevator
4 – Rudder
5 – Retract Gear
6 – Pitch
7 – Auxiliary or Gyro On-Off

The above apply to all Mode Two systems; for Mode One, channels 1 (Throttle) and 3 (Elevator) reverse.

A standard Airtronics switch harness less the "Y" connector may be used if channel 7 is not required.

When using any auxiliary equipment or testors, the connections as shown at the left should be observed.

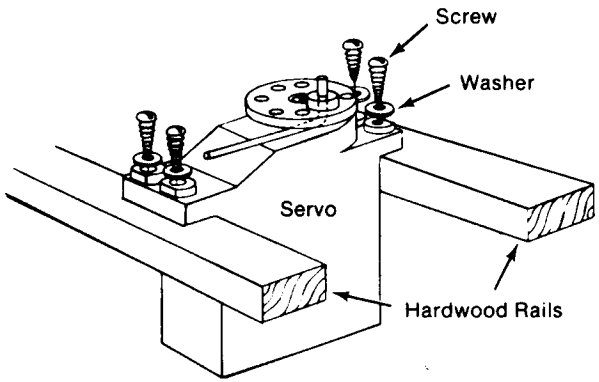
CONNECTORS PLUG IN RX W/ RED WIRE TO THE ~~REAR~~ OF THE RX, RIGHT SIDE

INSTALLATION IN THE MODEL

Plan your equipment installation carefully before starting. Keep in mind that many difficulties encountered with R/C equipment, and the resulting loss of a model, are caused by poor installations.

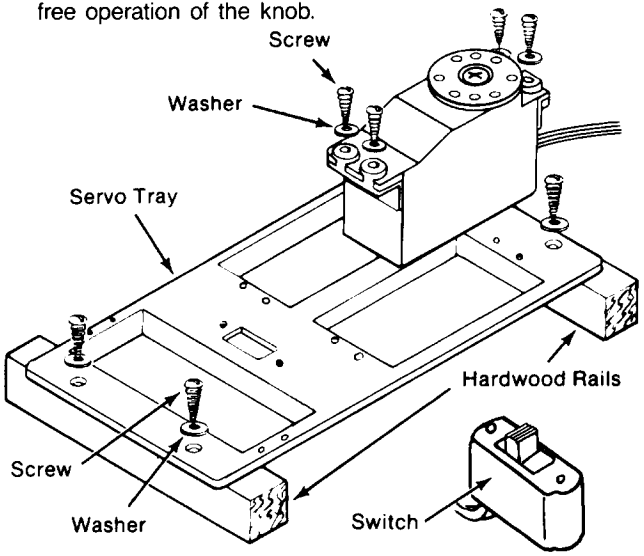
Insure that all control surfaces and mechanisms to be actuated by servos will move freely and without any binding. Only then should they be connected to a servo. Friction and mechanical will lead to premature servo and battery failure.

If at all possible, install your servos in one of the many types of Airtronics servo trays available. Doing so will effectively protect them from the knocks and vibration experienced in your model.



The receiver and the battery pack should be wrapped loosely in foam rubber at least ¼" thick and placed in the model so that they do not move around. Do not wedge these components into the model so tightly that the foam rubber padding is compressed. This will destroy the ability of the foam to dampen the vibrations and transmit them directly to the units.

Mount the On-Off switch in a convenient location which allows the plugs to mate with the receiver and battery. Be sure that there is enough slack in these wires to prevent their being pulled out from the receiver or battery pack during operation of the model. If the switch is mounted on the external surface of the model, be sure the hole is large enough to allow for free operation of the knob.



INSTALLATION IN THE MODEL

Additionally, if the switch is externally mounted, do so on the side of the model away from the exhaust.

The receiver antenna should be kept as far away from the servos, battery pack, switch harness or any metal pushrods being used. A recommended method is to run the antenna through the side or top of the model and back to the fin or stabilizer. Use a strain relief knot on the antenna where it exits from the fuselage to prevent putting strain on its connection to the receiver. Do not shorten it!

After completing the installation in your model, you should check once again to insure that no binding or bending of the linkages occur. Operate the servos over their full range, including the trim travel while observing the control system and listening to the servos individually. A bind anywhere in the control system will cause the servo to sound like it is straining. This is an undesireable condition which must be located and eliminated before flight.

An antenna down range check is a good test of the proper operation of your system. It should be done with every new installation, and it is always a good idea to repeat it before the start of a day's flying activities. The best way to make this ground check is with the model's antenna at right angles to you and with the transmitter, antenna down, with its antenna held at a 45 degree angle to the model. The actual range will vary depending on the type and construction materials in the model, but it will be ~~from 30 to 60~~ feet. Any large reduction can be a sign of a malfunction that should be corrected.

IN Excess of 100 feet