

INSTALLATION & MAINTENANCE MANUAL  
for the  
*Plane Prompter*  
Radio Control System



Price \$1.00

ECKTRONICS

2109 SO. WRIGHT STREET

SANTA ANA, CALIFORNIA



# *A Message from Ecktronics*

We have been active radio controllers for many years and have had the pleasure of building, in our modern plant, thousands of radio control transmitters and receivers. We have also had the opportunity of meeting and talking to radio controllers from all over the world.

Because of these experiences, we sincerely believe Radio Control to be the King of the scientific hobbies. None other offers all the thrills, the friendships, the satisfaction of this great sport.

We have long felt that if good, reliable R/C equipment could be made at a low price and if a complete package of everything needed could be offered to the modeler, many new converts would be gained for this truly outstanding hobby.

The Ecktronics Plane Prompter you have just acquired accomplishes this. The equipment is good — every single piece has been tested for countless hours. The price is well within the range of anyone interested in a serious hobby, and the Plane Prompter is complete — all you need is batteries and you're ready to operate.

The instructions which follow are to help you get started. Read them thoroughly and follow them carefully. You'll then be on your way to new thrills of the space age.

Good luck — and good flying.

*Bob + Dick Eck*



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## Description of Equipment

Let's briefly go over the functions of the pieces of equipment included in the Plane Prompter.

The Pacesetter (1) is a stable, crystal-controlled transmitter which operates on the 27 mc. Class "C" Citizens band. It's precise frequency is 26.995 megacycles. It functions in exactly the same manner as the transmitters used with drones, guided missiles, and satellites.

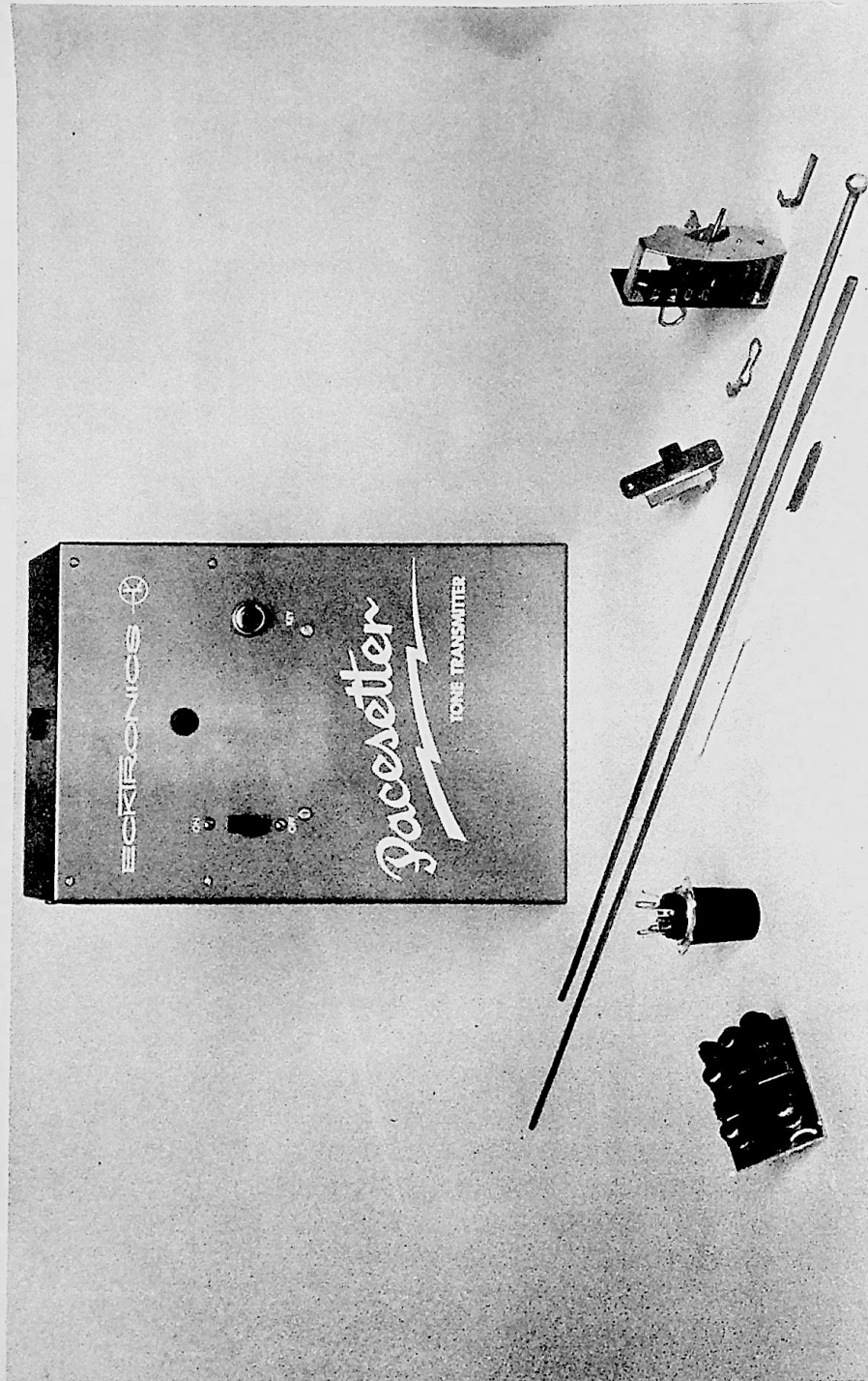
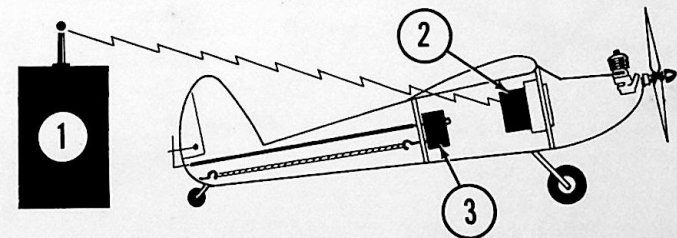
When you turn on the Pacesetter, it immediately sends out a 'carrier' signal at the desired frequency. Then, when you press the key, a tone (about 700 cps) is superimposed on the carrier.

The Courier (2) is an extremely sensitive receiver of the super-regenerative type. It "locks-on" the carrier signal sent out by the Pacesetter. Then, when the tone is sent out, the Courier greatly amplifies it causing a considerable current change.

The Translator (3) is a device which translates the electrical signal from the Courier to mechanical power to move the control surfaces.

When the key on the Pacesetter is pressed and held down, the Translator will move the rudder to "right" position. If the key is pulsed twice, the rudder will go to left. In any case, it always returns to neutral when the key is released. That's why the Translator is called the "escapement with a memory".

The other pieces of equipment are included to enable you to install and tune your equipment. Everything you need is there.



# Selecting and Building Your Airplane

If you haven't already started building your airplane, this is your next step now that you've acquired your control system.

Gone are the times when it was necessary to spend months of tedious construction to build something big enough for radio control flying. Most of the airplane kits now on the market are exceeding easy to build. Parts are pre-cut and instructions are detailed.

The design of model airplanes for radio control has come a long way since the early days of 8 ft. giants.

Now you have your choice of everything from tiny 30" wingspan planes to the many 6 footers which take a .45 size engine to pull them around. You'll note, as you look at the illustrations and description of Electronics planes below that they all fall somewhere in between these two extremes.

Generally speaking, the most successful planes for the newcomer are somewhere between 38" and 56" in wingspan and use engines in the .049-.19 category. Until the last few years the .15-.19 size was most popular but recent design advances make it perfectly feasible to start with smaller airplanes. Definitely leave the hot .29-.45 powered jobs to the experts. You might want to get into this type of flying someday but we urge the acquisition of plenty of stick time first.

We would lean quite strongly towards the Freedom 7 or the Concord as ideal first airplanes but there are many other good ones on the market which will do as well. Talk to your hobby dealer or other modelers — they'll undoubtedly have some suggestions.

Another interesting approach is offered by the Nomad which is really a powered sailplane. It is very stable in flight and quite simple to assemble.

As for building the airplane itself, take your time and do a good job. Use a good grade of model cement liberally and double-cement those joints where extra strength is required. Make sure you're building on a good, flat surface so your plane will be free of "built-in" warps.

When you cover the plane, use silk or nylon. Tissue is OK for free-flight, but tears too easily for radio. Silk or nylon add strength to your airplane and are less likely to need repair.



**THE NOMAD**

Engine Required..... .010-.024  
Wing Span.....48 in.  
Weight .....10 ozs.

**FREEDOM 7**

Engine Required..... .049-.099  
Wing Span.....40 in.  
Wing Area.....280 sq. in.  
Weight .....25 ozs.



**THE CONCORD**

Engine Required..... .07-.10  
Wing Span.....46 in.  
Wing Area.....322 sq. in.  
Weight .....32 ozs.



# Obtaining A License

It is illegal to operate the Pacesetter (or any similar transmitter) without obtaining a license. This is very easy to accomplish, however. All you have to do is fill out a simple form, send it to the FCC, and a license will be sent to you. We have even included the form so you won't have to go to the trouble of sending for it.



Don't let the complicated appearance of the form throw you. It's really quite simple. Let's go through it step by step and you'll have no trouble at all.

Note that the second page is called "Work Sheet". This is the copy you keep. Put down your answers on it in pencil. Then, when you're sure it's right place the same answers on the other sheets with a pen or typewriter.

Here's how to fill out the work sheet:

- Item 1a—Put "Class C"
- Item 1b—Put "Class C"
- Item 1c—Skip "base" and "fixed"—put "one" under "mobile".
- Item 2—Insert your full name and address.
- Item 3—Your location is not fixed, so leave this one blank.
- Item 4—Place a check mark on box "C".
- Item 5—Put down your general area or state, such as "Oregon Area".
- Item 6—Skip this one.
- Item 7—Check "Individual"
- Item 8—Check the "yes" in 8a—skip the rest.
- Item 9—Put "Model Radio Control".
- Item 10—Omit.
- Item 11—Check "yes".
- Item 12—Omit.
- Item 13—Omit.
- Item 14—Omit.

Now transfer the information on your work sheet to the other forms. Be sure to sign the bottom part of the forms. DISREGARD THE "NOTARY PUBLIC" REQUIREMENT—the rules have changed and this is no longer necessary. Now send the forms to the FCC in Washington and you'll have your license back shortly.



## Radio Installation

The Courier is the simplest receiver yet to install in your airplane. The Translator is also very straightforward and should offer no problems.

The best way to mount the Courier is to wrap in a layer of foam rubber about  $\frac{1}{2}$ " thick. It should be mounted vertically, with the printed circuit side of the board facing the front of the airplane. An alternate method is to glue it to a  $\frac{1}{2}$ " piece of foam rubber with contact cement and then to cement the foam rubber to a plywood slide.

The Translator is mounted using two machine screws with nuts and lockwashers, 2/56, 3/48 or 4/40 sizes are proper. Follow the Translator instructions for rubber, etc.

Mount the switch to the side of the airplane. Generally a vertical position is preferable to horizontal since we are all familiar with light switches, etc. where "up" is on and "down" is off. This may seem like a minor precaution, but there is nothing more frustrating than watching your model fly away simply because your flying partner turned the receiver off when he thought he was turning it on.

Now, follow the wiring diagram in the Courier instructions and carefully install the wires as shown. Since as you proceed in this hobby you'll be doing more soldering from time to time, let's review soldering techniques so you'll know how to do the job properly.

1. Use rosin-core solder. Acid-core solder may be OK for car radiators but it's not for this job. Remember, rosin-core only.
2. Make sure your soldering iron is hot and well-tinned. To tin an iron, either wipe off the tip or lightly file it and apply solder.
3. Use only 19 strand wire. Never use 7 strand or solid core—vibration could cause them to break.
4. To make a joint, strip about  $\frac{1}{4}$ " insulation off the wire, twist the wire gently together and then pre-tin it by heating it with the soldering iron and applying a small amount of solder. Then, loop the wire around the lug which it is to be soldered to. Apply heat by holding the tip of the iron to the joint. Now, hold solder on the joint until it flows. Remove the iron and the solder from the joint and allow it to cool. Do not move the wire while it is cooling.

Good soldering joints are very easy to make following the above procedure. A good joint is shiny—not grey or grainy in appearance. If you work carefully at this stage your effort will be amply repaid by a trouble-free installation.

### BATTERIES

You will need three batteries for your Pacesetter transmitter (2 - 67½ volt and 1 - 1½ volt) and two 1½ volt pen cells for the Courier and Translator. Batteries are not included with the Plane Prompter package because we want to insure that they are fresh. Your hobby dealer will have a supply.

Although the Pacesetter is a full power transmitter with plenty of range, it is extremely easy on batteries. You can safely use the "A" battery until it drops down to 1.1 volt. The "B" batteries will function satisfactorily until their combined voltage is 100 volts.

## Radio Installation

To install the transmitter batteries, first remove the four side screws and the top back cover screw. This will enable you to remove the back cover of the Pacesetter. Note that a 2-pin plug is provided for the "A" battery and "snaps" are used for the "B" batteries. Enough wire length is provided so that you can first attach the plug and snaps to the batteries and then slide them into the case. Before attaching the cover, press the key. The neon indicator will light. If it doesn't, check to make sure the snaps are connected on the batteries. Then, attach cover with the five sheet-metal screws, inserting the foam pad furnished between the back and the batteries to hold batteries securely in place.

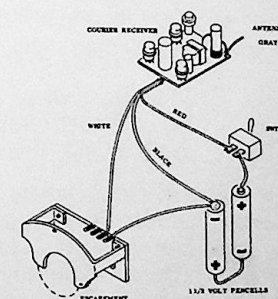
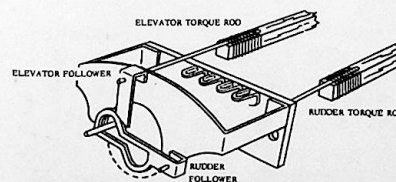
The surest way of connecting the pen cells in the Courier-Translator circuit is to solder them directly. This is an easy matter with a good hot soldering iron. Do not hold the iron on the battery any longer than necessary since excessive heat will damage the batteries.

You may, if you prefer, use a battery box for the pen cells. If you do, make sure you have a good one with floating spring contacts so vibration will not cause trouble.

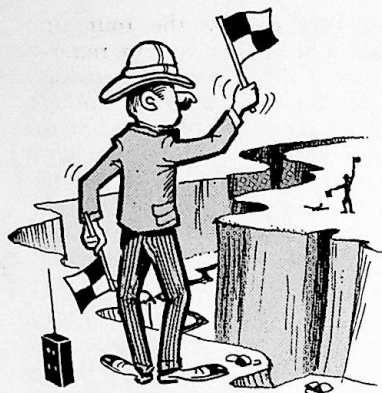
**CAUTION:** Some of the newer flash-light batteries use an extra steel false bottom on the negative end. This is OK for flashlights but no good for model airplanes which vibration is encountered. Cut this false bottom off to expose the zinc. Then solder directly to the zinc. If using a battery box, the terminals can now make direct contact with the zinc.

In order to obtain longer battery life, you may use four pen cells instead of two with the extra two wired in parallel with the two shown in the wiring diagram, or with the extra two used as a separate source of power for the escapement.

If you intend to do a great amount of flying, you may wish to invest in nickel-cadmium batteries. These are 1.25 volts each, so you will need three of them. They can be recharged indefinitely.



## Tuning and Range Checks



Your Pacesetter and Courier have been accurately tuned to each other at the factory. The tuning procedure described below is presented so that you may touch up the tuning at any future time. This may become necessary since electronic components shift slightly in value with age.

Never touch the transmitter tuning since this should be done only at the factory. It is a fairly complex job and requires expert knowledge for optimum results.

Receiver tuning is quite easily accomplished and is done in the following manner.

Have a friend walk about 50 yards away with your Pacesetter. When he depresses the key, engage the tuning slug with the tuning wand. Turn the slug back and forth between the points where the actuator ceases functioning and then set the slug at a mid-way point between. Then have your partner walk out to the farthest point at which the receiver will operate. Again rotate the slug to obtain final setting.

Once tuning has been accomplished, it should very rarely require any attention whatsoever. Occasionally, after much use, and especially if a great deal of vibration is encountered, the slug in the tuning coil may become loose. If this occurs, a drop or two of wax from a birthday candle will serve to hold the slug securely.

### FACTORY WARRANTY AND SERVICE POLICY

Your equipment is fully guaranteed for 90 days from date of purchase except as follows:

1. Tubes and transistors are not guaranteed.
2. Modification or tampering automatically cancels the guarantee. To validate your warranty, you must fill out the forms and mail to the factory within ten days after date of purchase.

If your equipment should require service, pack it carefully and include a note describing any difficulties. Enclose \$1.00 to cover mailing and handling. If within the 90-day warranty, the \$1.00 will be the only charge with the exceptions noted above. If it is beyond 90-days, a reasonable charge will be made for parts and labor. Address to: Ecktronics, 2109 S. Wright St., Santa Ana, California.

## Flying Hints



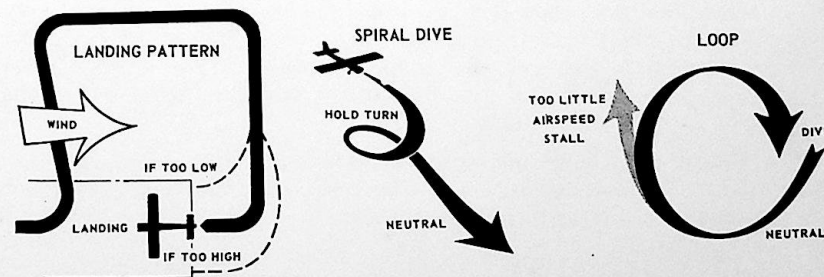
Flying your model—this is the most fun of all, and it's certainly the "proof-of-the-pudding" so far as your efforts are concerned. If you proceed carefully and logically, you'll have a successful airplane which you can fly for years. If you are sloppy and haphazard in your approach to flying, all your efforts can be wasted in one short flight.

Let's assume your tuning and range checks have been completed and everything is working perfectly. The next step is carefully check your airplane for proper alignment of the control surfaces. If you have any warps in the wing, stabilizer, or rudder, take them out *now*. This can be easily done using a steam-kettle. Steam the part twist it in the opposite direction of the warp, and allow it to dry.

Check your engine mounting to be sure you have the proper amount of down-thrust and right-thrust as called for in the airplane plans. Balance the airplane to see that it balances at the proper point. Usually this is about 1/3 back from the leading edge of the wing. Remember, at this point it is better to have the airplane be slightly nose-heavy rather than tail-heavy. The reason for this is that if a plane is too nose-heavy, it simply will not climb or, at worst, might make a gradual descent to the ground under power. A tail-heavy airplane on the other hand, can go into a horrendous stall and then dive to the ground which can be far more damaging.

If at all possible, have an experienced R/C flier conduct your initial flights. If things aren't adjusted quite right, he won't panic and will be able to fly the airplane until he can get it back on the ground to make any necessary changes.

Generally speaking, it is best not to hand-glide your model, but rather to use a short, rich, engine run and fly it under power. If the airplane has a tricycle landing gear (such as the Freedom 7 or the Concord) and you have access to a smooth take-off and landing spot, your best bet is to let it take off under its own power. Otherwise, a good hand launch is the answer.

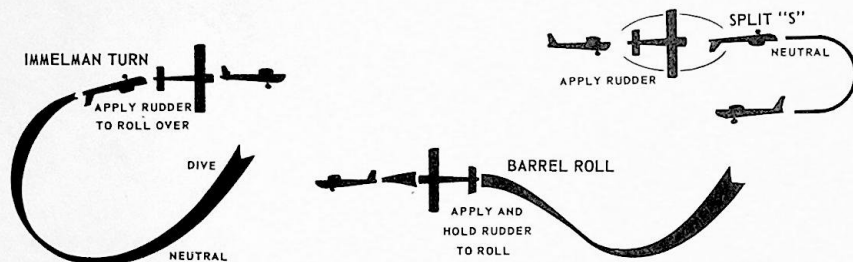




## Flying Hints

Whether a hand launch or R.O.G., stand about 10 ft. behind the airplane at the beginning and do not control until the airplane has gained some altitude.

Control for short blips at first until you get the feel of the plane. Keep the model upwind at all times. Then when the engine cuts bring it around in a wide circle so that you land into the wind.



### Symptom

1. Very slight climb angle — glide too steep.
2. Glide OK, but climb angle too shallow.
3. Glide OK, but "porpoising" tendencies (repeated stalls) under power.
4. With neutral rudder, turns in same direction under power and in glide.
5. Glides straight, but turns under power.
6. Flies straight under power, but turns in the glide.
7. Flight under power OK, but stalls in the glide.

### Correction

- Add slight amount of incidence to wing by raising leading edge.  
Decrease the amount of downthrust.  
Increase the amount of downthrust.
- Check for wing or stabilizer warps — correct by holding surface over steam, twisting to desired shape. If tendency is slight, can be corrected by changing neutral rudder angle.
- Move thrust line to right or left — away from direction of turn.
- Check and correct warps as in (4) above.
- Check balance — add weight to nose if necessary or shift batteries forward.

So far as stunting is concerned, we recommend that in the beginning you confine your activities to simply flying the plane around and keeping it under control. Concentrate on making smooth, gentle turns both right and left. Keep the airplane upwind at all times and plan your approach so that you land in a spot you've picked out.

After you have a few flights of this type under your belt, try your hand at spiral dives and loops. The spiral dive is actually the foundation of all rudder-only R/C stunting. It is accomplished by simply holding a right or left turn. The speed thus gained is used to zoom the model for other maneuvers. In the loop, for instance, you simply build up enough speed in the spiral dive, neutralize, and the model will zoom up and over on its back automatically.

A few of the more advanced rudder-only maneuvers are illustrated below. They should only be undertaken after you've gained some experience with the simpler stunts.

## Your Future R/C Activities

Now that you've "gotten your feet wet" in R/C, you'll undoubtedly want to go into more ambitious projects. Before you jump into that scale 4-engine bomber with full controls, we'd like to suggest that you try a few things.



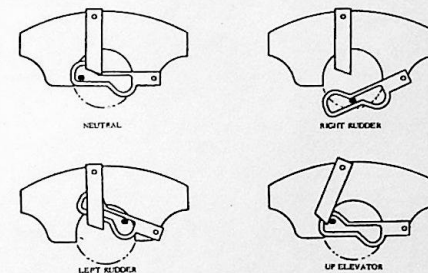
First of all, if you haven't already done so, we would suggest that you incorporate "kick-up" elevator in your model. You needn't add any equipment at all — the Translator is already set up to accomplish this. Just separate the elevator from the stabilizer, apply cloth hinges, and install the torque rod and follower on the translator.

Your keying sequence now becomes:

One pulse—right rudder

Two pulses—left rudder

Three pulses—up elevator



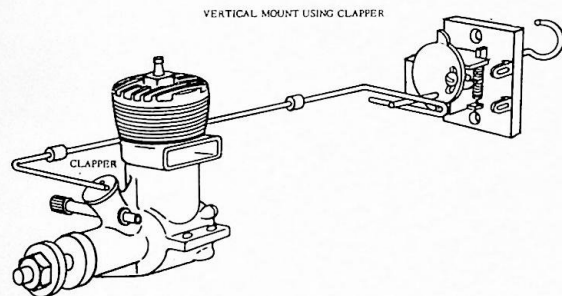
This will change your flying technique somewhat. Now, when you do a loop, it is not necessary to gain so much speed in a spiral dive before neutralizing. The amount required will vary with the airplane, but generally speaking, all you'll need is one-half to one turn in the dive. Then neutralize and apply up elevator as the plane straightens out. The same technique applies to the split S and Immelman.

You can also use the up-elevator to achieve "flared-out" landings. Just as the plane is about to touch down, apply up-elevator. This is particularly effective on airplanes with conventional landing gear (as opposed to the tricycle type). You have to be a bit careful on this one, however. If you "kick-up" too soon, the airplane can nose-up into a stall and then drop its nose rapidly down to the ground. That's hard on airplanes to say nothing of props.

## Your Future R/C Activities

The next logical step is, if your engine has a throttle or can be adapted for one, to add motor control.

The engines which are designated R/C engines all have either an intake or exhaust throttle (or a combination of the two). This category would include the Fox 10 R/C, Fox 15 R/, K & B 19 R/C, Veco 19 R/C, etc. other engines with front rotary valves can be easily adapted by making a simple "clapper" out of tin or brass as shown in the illustration. Such engines are the Fox .049, Fox .07, Cox TD series, K & B .09, the McCoy engines, etc.



This can be done very simply with the Ecktronics Enginac. The Enginac is an escapement similar to the Translator except it is designed specifically to give three different engine speeds rather than control the rudder or elevator. Complete wiring instructions are included with the Enginac for integrating it with the Courier and Translator. At this stage of the game you should have no trouble at all in hooking it up.

When the Enginac is in the circuit, it is activated by the "quick-blip" method, that is, a quick tap on the Pacesetter key will cause the motor to change speed while you are undergoing pulsing for rudder or elevator control.

If you have started with the Freedom 7 or Concord, you might wish to go to either a little "hotter" low wing airplane such as the Liberty 7 or a larger plane like the Freedom 15 or Liberty 15.

Whatever your course of action, we know you'll experience years of enjoyment in Radio Control, the king of the scientific hobbies.



## Sources of Information

If you desire to know more about R/C the best sources are the three nationally-distributed model magazines. These are "American Modeler", "Flying Models" and "Model Airplane News". Each magazine has information about the newest airplanes and R/C equipment. Each of them has a very competent Radio Control Editor. Howard McEntee is the R/C editor for American Modeler, Ted Strader writes for Flying Models and Ed Lorenz performs the R/C chores for Model Airplane News. Their columns are always chock-full of valuable pointers and interesting news from readers.

If more technical information is desired, you may obtain "Grid Leaks", published by Ace Radio Control, Higginsville, Missouri.



*We have tried to get you started right in  
Radio Control - Now you are on your own.*



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