"AT" PI-27 Rcvr

For quick exchange from model to model, this 27¼ mc. receiver and relay plug in like phone jack. Let's go, Jack, let's go!

By LEO C. CUNNIFF, W2OEH

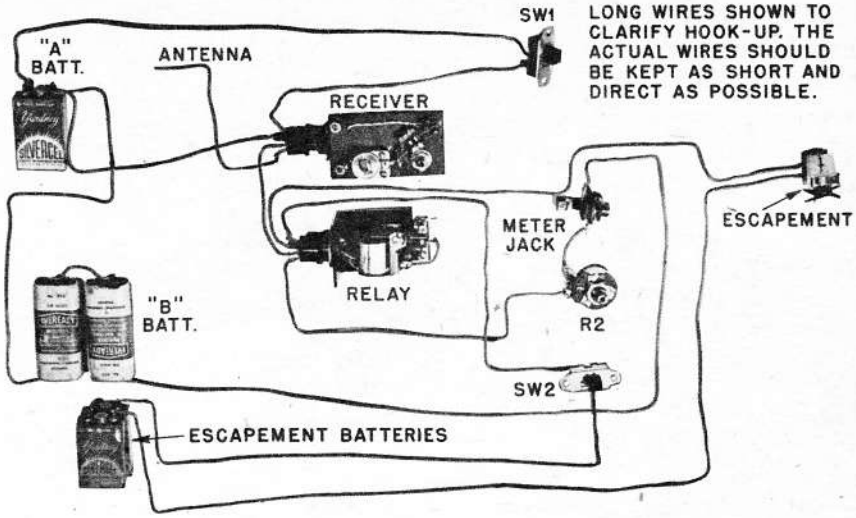
■ This is the plug-in type receiver used in the Magic Maid R/C plane. A typical gas circuit, it is notable for the quick-disconnect feature and also for the Silvercels which it uses. Note, too, that the relay is also a "plug-in" affair.

Although the gas tube circuits are admittedly somewhat tricky to adjust, when working properly they are about the most sensitive receiver possible, considering their size and weight. The tubes themselves vary in their characteristics, and it is necessary to adjust the circuit values to take care of tube variations.

The relay is mounted separately from the receiver to make for a better distribution of weight and to enable the equipment to be effectively shock-mounted. The plug-in feature enables one set of radio equipment to be used on more than one model and it makes for accessibility in servicing.

The steps to be followed in the construction of the receiver are as follows:

1. Cut and drill the bakelite base.
2. Put all eyelets in place and set them with a small hand punch.



bakelite or lucite rod or tube ¼" in diameter and 1" long. After drilling a hole and pressing in the wire leads which can be about #20 solid wire, the form is wound full of #30 enameled wire.

After the equipment is completed, it should be set up and bench tested before installation in the plane. Before turning on the switches, rotate the potentiometer full counter-clockwise so as not to exceed rated tube current.

Put the antenna coupling to minimum, connect a 24" antenna and turn the receiver switch on. Adjust the potentiometer for a reading of about 1.2 ma. on the meter.

Turn the transmitter on and tune the receiver to the transmitter by moving the coil slug in or out of the winding area. As the receiver is tuned in, the current should drop to a value of 0.1 ma. or less. Due to component variation it may be necessary to add or subtract turns from the coil to obtain proper tuning. Add or subtract one or two turns at a time until the receiver tunes as noted above.

Now is the time to learn the effects of the various controls, with equipment on bench. This table shows what each control does to circuit, and how it affects operation.

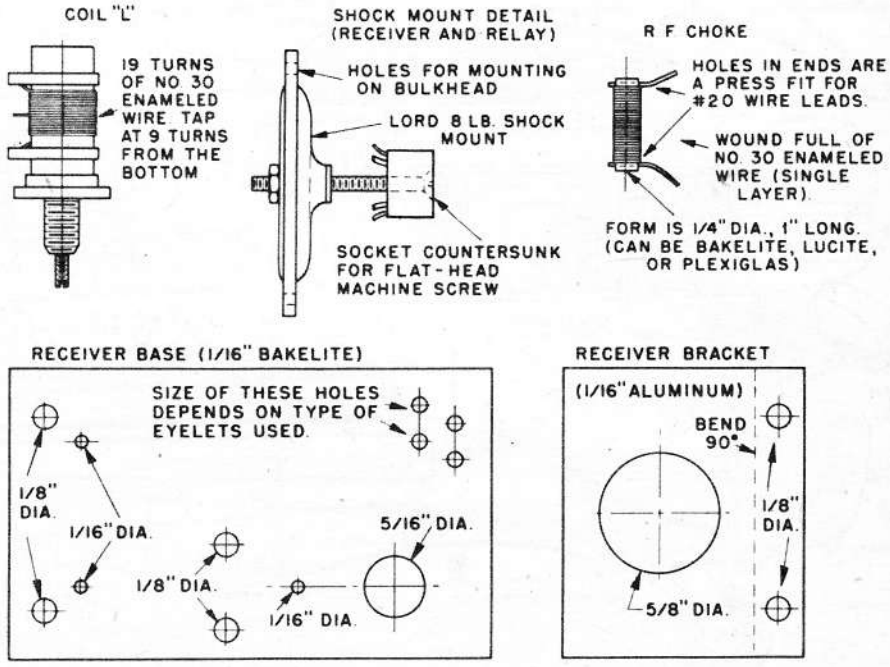
CONTROL	FUNCTION	EXPLANATION
Potentiometer	Controls current through tube and relay.	Increasing resistance decreases current. Wiring shown will cause resistance to decrease with clockwise rotation.
Tuning Slug	Tunes receiver to transmitter.	Running slug into the winding area increases coil inductance, and decreases the frequency that the receiver is tuned to.
Antenna Coupling	Controls amount of signal fed into receiver.	Increasing coupling raises the idling current of the receiver, but also decreases the dip on the signal. New tubes require low couplings; as they age, coupling is increased.

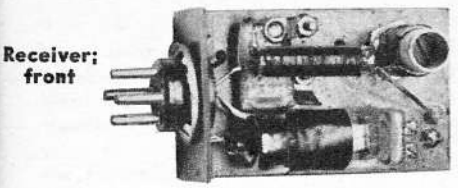
The relay should be adjusted to pull in at about 0.9 ma. and release at 0.7 ma. This adjustment is made by means of the three

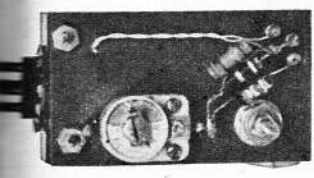
3. Mount the antenna condenser, the coil, choke and other small components. Do not mount the tube at this point.
4. Wire all components into the circuit (except tube). Leave leads that connect to the plug long enough for soldering into plug.
5. Bend and drill the two brackets for relay and receiver.
6. Mount the plug on the receiver bracket by means of the snap ring that comes with the plug, and mount the bracket-plug assembly to the receiver base. Run the wire leads through the holes in the pins, and solder in place.
7. The tube is now soldered in place. Scrape any lacquer off the leads and grip the tube lead between the glass envelope and the soldered connection with a pair of long-nosed pliers while soldering. This will conduct the heat away, and prevent possible damage to the tube.
8. The relay is assembled on its bracket and wired into the plug as was done on the receiver.

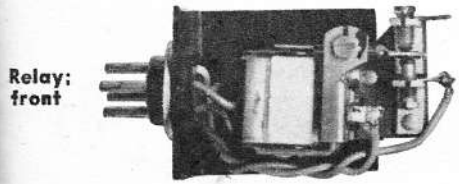
The coil is wound as shown. After the equipment has been tested, the winding can be coated with coil dope or liquid polystyrene, to hold the turns in place.

The choke is made on a polystyrene,









screwdriver adjustments on the relay. The potentiometer is used to set the proper value of current. The relay armature should always have air clearance between it and the pole face of the coil, to prevent relay sticking.

The sockets for the receiver and relay are drilled and countersunk for a small flat-head screw and then attached to the shock mounts. The shock mounts are attached to the bulkheads with four bolts at the corners.

The interconnecting wiring is shown in the spread-out view of the radio equipment. In the actual wiring keep leads as short and direct as possible, yet allow some slack to take care of shock and vibration.

Complete check of receiver operation should be made before test-hopping. Some flyers test-hop without radio equipment, but the writer has saved ships from crashing on the initial flight by the use of the radio. Receiver tuning should be checked on the field at a distance of several hun-

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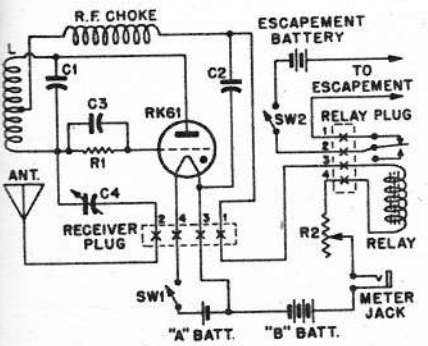

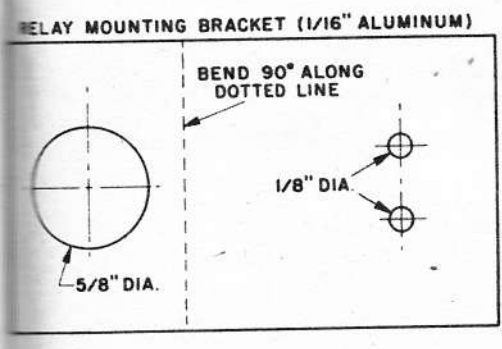

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dred yards from the transmitter. A plate current dip on signal to less than 0.1 ma. should be obtained. Radio checks between flights will pay off in dependability.

Selection of batteries to power the receiver depends on the model's weight-carrying capacity and on the amount of flying that is done. The "B" batteries shown are of the so-called hearing aid type and will give fairly long service. The "A" battery and escapement batteries are

Yardney Silvercels. These are an extremely light, rechargeable type cell. (The filament battery should be under a pilot-light load for 1.5 hours before connecting to set.) The initial expense is much higher, of course, than for dry cells. However, if a good deal of flying is done, the investment is worthwhile. Naturally, the radio equipment will work equally well with either type of power.

Bill of Materials

(Where the information is of help, the manufacturer and part number of an item are given immediately following the colon.)

2 plugs, four prong, for receiver and relay: Amphenol, 86-CP-4S. 2 sockets, to mate with foregoing plugs: Amphenol, 78-S4S. 1 tube: Raytheon, RK-61. 1 coil form: Cambridge Thermionic, L-5 with red slug. 1 condenser, plate bypass 0.1 mfd, 150 volt (CZ): (smallest physical size obtainable). 1 condenser, antenna coupling 4-40 mfd ceramic (C4): Erie, Ceramic on Trimmer type TS2A or equal. 1 condenser, tuning, 4.7 mmfd ceramic (C-1). 1 condenser, grid leak, 100 mmfd ceramic (C-3). 1 resistor, grid leak, 3.9 megohm ¼ watt (R1). 1 potentiometer, 25,000 ohms (R2). 1 relay, 8000 ohm coil: Sigma 4F. 2 switches, S.P.S.T. 2 shock mounts, 8 lb.: Lord or equal.

#30 enamelled wire, #26 plastic covered wire, short piece of #20 wire; aluminum—1/16"x1½"x3⅞". Bakelite—1/16"x1½"x2½". 3 Yardney Silvercels.