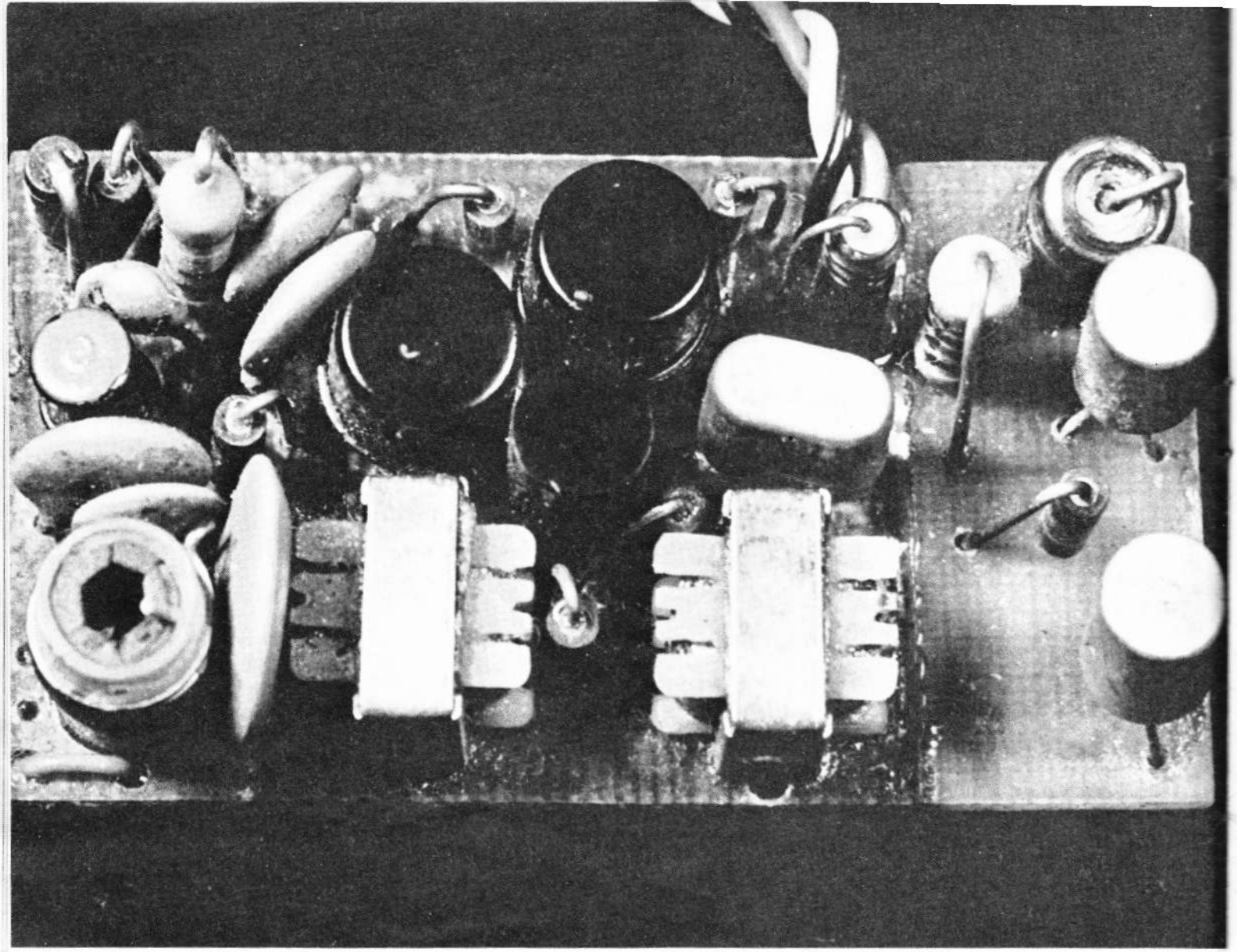


"Stick-On-Switcher" epoxied to Controlaire 5 receiver (right). Coil has been modified on prototype for operation in Australia on 40-68 Mc.

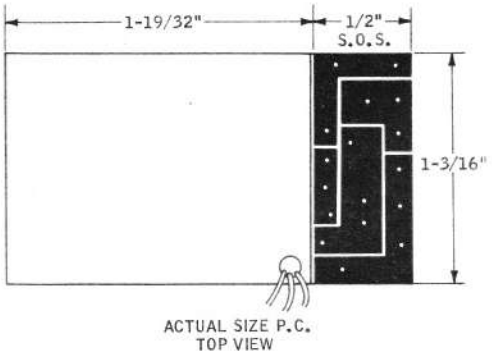
STICK-ON-SWITCHER

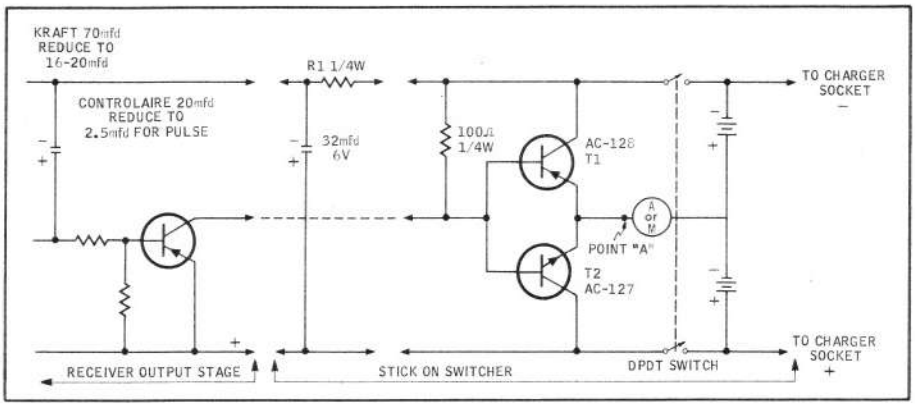
From "Down Under," a "Stick-On" Switcher for Operating Motorized Galloping Ghost Actuators From Relayless, Single-Ended Receivers. By R. B. Wallace

HERE is something for the "Sport Flyer" which will give simple reliable control of pulse rudder or "Galloping Ghost" from any single ended relayless receiver. It will operate motorised actuators such as the Rand, Go-Ac, Mighty Midget, T-05 etc., and will also work magnetic actuators such as Adams, Septalette etc. Although I have only used this switcher coupled to a superregenerative receiver, it should perform equally as well with a superhet.

One big advantage — especially when small .020 or .049 sized planes are used — is the common battery supply, which is not limited to 3 volts. Any voltage you prefer may be used on the actuator and the maximum voltage on the receiver is still only 3.6 volts. My experience has shown that when using three "Nicads" on a 3 volt receiver such as the Controlaire 5 or Kraft K3VK the surplus "float" voltage above 3.6 volts, which remains after removing them from the charger until a little use reduces the voltage to about 1.2 volts per cell, eventually causes the receiver to fail. This will not happen with this unit provided the initial setting-up is done with fully charged batteries.

During the last year or so I have had over 150 flights with my 30 inch .049 powered plane using this switcher, a Controlaire 5 receiver and four 225 MAH. "Nicads." The actuator was a Mighty Midget Motor operating pulse





rudder. I have also flown it using "Galloping Ghost" and have not had a single malfunction. The Adams actuator also works perfectly when wired as shown in the diagram.

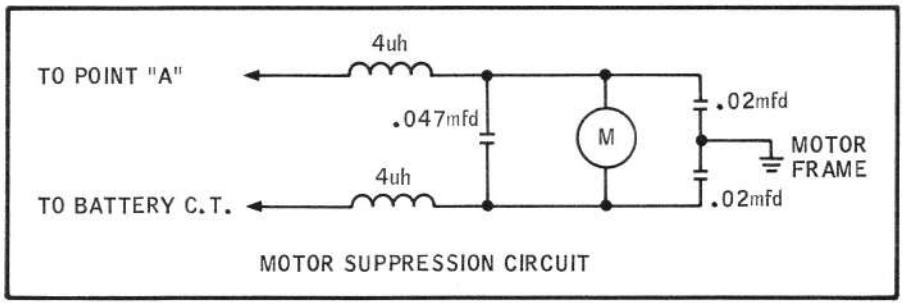
CONSTRUCTION

Construction is simple and can be followed from the twice sized P.C. layout shown. The completed unit may then be epoxied to the output end of the receiver, thus making a compact single unit installation. Connections from the switcher to the receiver are made with short lengths of hook up wire on the copper side of the board.

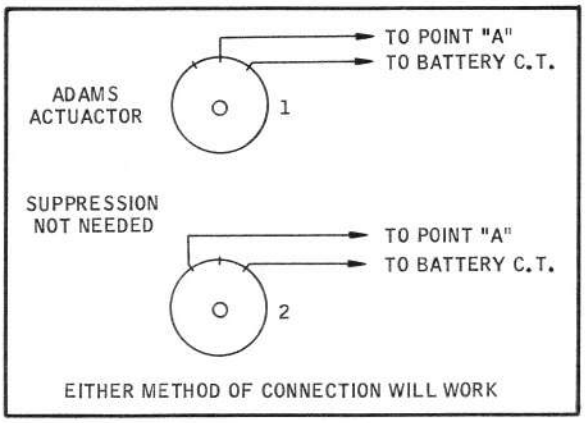
The AC127 (NPN) and AC128 (PNP) transistors used are manufactured in Australia by Philips Electrical Pty. Limited, but General Electric 4JX1C 1132 (PNP) and 4JX11C 1847 (NPN), Fairchild 2N 3638 and 2N 3646 or T. I. 2N 1303 and 2N 1304 should work equally as well. When using G.E., Fairchild or T.I. transistors to operate a motorised actuator, it might be as well to bear in mind their maximum ratings and include a current limiting resistor or a No. 43 pilot lamp at point "A" to keep the current through the motor circuit within those ratings. This is not necessary with the Australian transistors as they will stand upwards of 1 amp.

SETTING UP

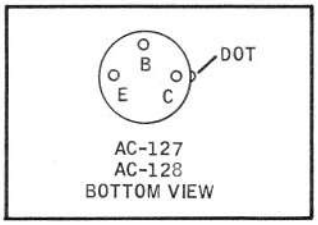
Insert a 1K potentiometer, set at maximum resistance, in the position



MOTOR SUPPRESSION CIRCUIT

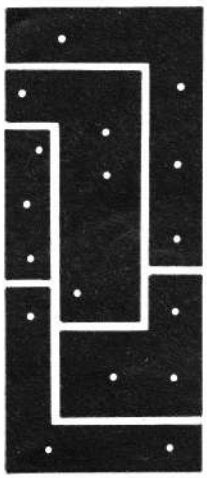


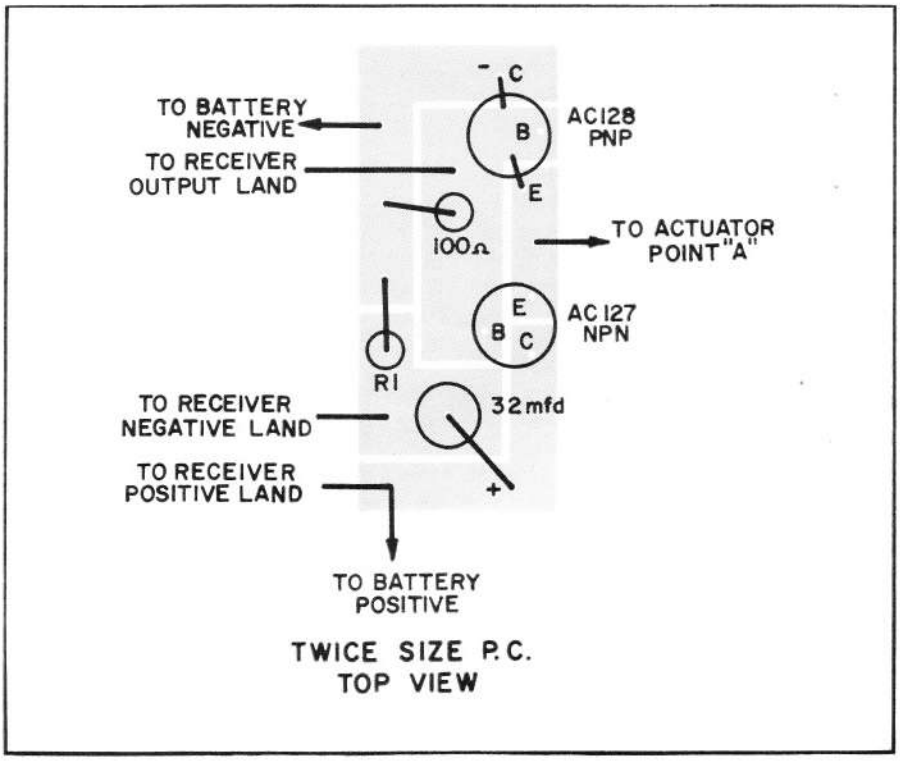
EITHER METHOD OF CONNECTION WILL WORK



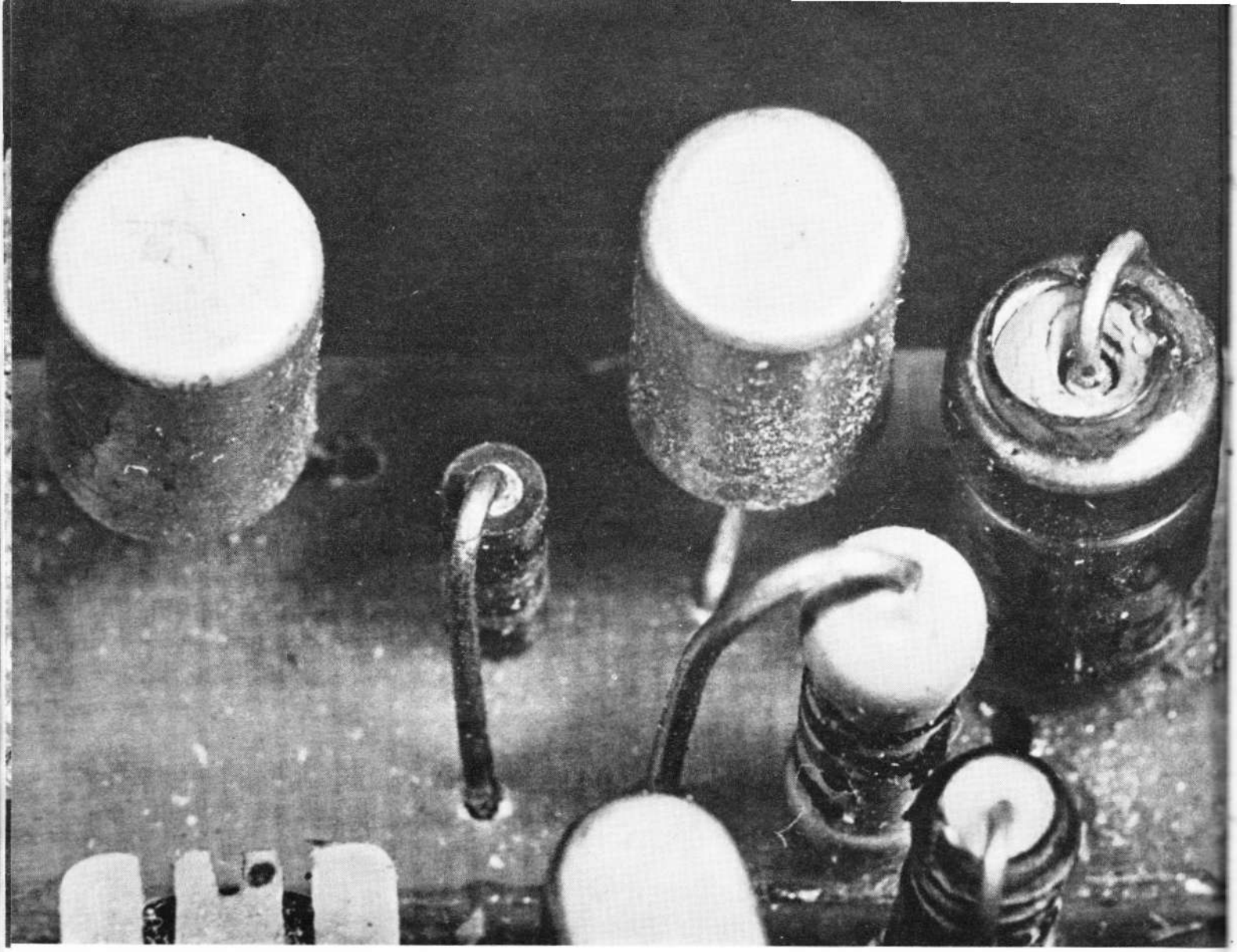
AC-127
AC-128
BOTTOM VIEW

Twice Size P.C. Board





TWICE SIZE P.C.
TOP VIEW



Top row, L to R: AC 128, AC 127, 32 Mfd. Middle row, L to R: 100 ohm (R-1). Bottom row, L to R: part of receiver — transformer, 2N229, 2.2 Mfd. electrolytic.

shown for R1, and place Voltmeter leads across the receiver positive and negative lands. Connect batteries and switch on. Gradually reduce the potentiometer resistance until the voltmeter reads 3.6 volts. Remove the potentiometer, measure its resistance and insert the nearest standard value resistor above the measured value in the position for R1. The value for my Controlaire 5 was 220 ohms. **NOTE:** It is important that the "Nicads" are **fully charged** before this setting up is commenced.

Should you propose to use a TO-5 motor with 1.5 volts each side, the 32 mfd. electrolytic and R1 may be omitted. These are only necessary when the total **actuator** voltage exceeds the maximum voltage allowable on the receiver.

ACTUATOR SUPPRESSION

It is essential to suppress the actuator, otherwise the electrical noise will feed back into the receiver, causing peculiar and erratic pulsing. Many circuits for suppressing the motor have been published in various model magazines. The one used on the Mighty Midget in my plane consists of an R.F. Choke in each motor lead, a .047 mfd capacitor across the motor brushes and a .02 mfd capacitor from each brush to the motor frame. I found that the R.F.C.s must have a very low D.C. resistance (not exceeding 1 or 2 ohms each). Higher resistance in this part of the circuit reduces the voltage across the motor and is detrimental to optimum performance. Mine were made from Ferroxcube-cored choke type VK2CO 10/3B rewound with 6 turns of No. 38 enamel wire. These cores are about ⅜" by ⅛" diameter with several holes running lengthwise. The Controlaire 4 uh R.F.C. would probably be satisfactory.

I found that the Adams Actuator did not need any suppression.

If you should try this Stick-on-Switcher I feel sure you will have many hours of reliable and enjoyable flying.