Add-on Switcher for Motorized Actuators

Simple circuitry adapts Relayless Receivers for use with Actuators of the Rand Type.

Circuit By GERALD PERKINS

OST EVERYONE agrees that a relayless receiver, when used with an Add-on Switcher and a double coil actuator, is superior to a receiver which uses a relay. It requires no contact cleaning, no tiresome adjustment, and does not need arc suppression. While there have been some circuits presented that did the job for motorized actuators, not all were fully capable of doing the job with many of the actuators on the market, since they were limited as to current carrying capacity, and voltage characteristics of the transistors, and also were finicky about which motor they liked to work with. Some also used two sets of batteries.

This circuit, by Gerald Perkins of

Hendersonville, North Carolina, hap-pily overcomes most of those objections. It is a simple and straight forward single pole double throw type of switcher, is very simple to wire and has a component callout of only 7 electronic parts. It does have one variable factor, but this simply means that it is adaptable for a wide range of relayless receivers and also a wide range of actuating devices.

It uses three transistors, two of which must be the complementary types-NPN and PNP of the switching variety. Gerald says that he has used the Texas Instrument 2N1302-3 and 2N-1304-5 because of the low VCe saturation and fairly uniform characteristics.

The GE 4JX1C1132 and 4JX11C1847 also will work well. The Fairchild 2N3638 and 2N3646 work very well and also, since they are epoxy units, seem to withstand the current drains without overheating.

R4 which is in series with the motor is the variable in the circuit. By varying this you can tailor the speed of the actuator to suit the voltages that are going to be used, from 2.4 to 4.8 volts, or even more in some cases. Drain should not in any case exceed 500 milliamperes with the Fairchild units and 300 miliamperes with the TI or GE devices.

A full size printed circuit board pat-(Continued on page 25)

- V (2.4-3.6 V)



Add-on Switcher

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tern is shown for those who wish to use the photo process. Your local blue print shop, or any place that has a process camera (such as a printer with offset equipment), can prepare a negative for you at nominal cost. Use 1/32", 3/64" or 1/16 inch copper clad laminate.

If you wish you can also use the Exacto process. You scribe in the lines where you wish to scrape the copper off, and then peel, brother, peel. Since all the lines are straight, this method is fairly simple to use. Use a size 60 drill for the holes which are for the components.

All of the components are available from most electronic houses, and a kit with completely etched and drilled base will be available from Ace R/C.

Basing leads of the TI, GE and Fairchild transistors are the same, so you will not have any difficulty in mounting the transistors on the PC base. Install Q1, then Q2, then Q3, seeing that they stand about 1/8 inch above the PC base. Then install the four resistors. Note that three stand on end, and one lies flat on the board. R4, you will find, may vary from 2.7 ohm to 10 ohm depending on the voltage supply used, and motor you will be using in your actuator. If you are using it with the Rand, get it high enough so that the motor control portion of the Rand will cycle through on full on or full off. If this resistor is too high the Rand unit will not cycle through the motor control positions.

Solder 19 strand #26 hookup into the four positions required on the PC board using wire that is long enough to effect the hookup in your model.

Double check all solder connections on the PC base. Clean the printed circuit board. Isopropyl alcohol makes an excellent cleaning agent. If you wish you can spray the printed circuit board with clear Krylon or paint with clear dope to prevent any high resistance shorts and to prevent the copper from tarnishing. Insert the four wires through a rubber grommet (a servo mounting grommet is ideal). Mount the AOS-M in an Ace PB#1 plastic box, which measures 1 x 1 x ³/₄. You can make half moon cutouts in both the bottom and the lid to accept the grommet. Use foam rubber or polyurethane padding in the box to prevent the switcher from rattling about.

The completed unit may be mounted anywhere in the airplane near the receiver and actuator. It can be hard mounted, or foam can be used if desired for shock mounting.