

7377 BEVERLY BOULEVARD, LOS ANGELES 36, CALIFORNIA

Operating Instructions

for the "Pulsi-Tran"

PROPORTIONAL PULSER

(MODEL CS-504)



DESCRIPTION

Your CS-504 Proportional Pulser is the smallest and most convenient production unit of its type presently available. It is designed to attach directly to the front of your hand-held R/C transmitter and provide one compact package for controlling your proportional vehicles.

The "Pulsi-Tran" is designed for rudder-only proportional control, utilizing a single large knob for pulse width control. A smaller knob provides on-off control and rudder trim action. No rate control is incorporated, therefore this pulser cannot be used for separate elevator control, for "Galloping Ghost" or "Simple Simul" systems.

Dependable performance is obtained from a 3-transistor circuit powered by three pence batteries (4.5 volts). Except for the relay, no moving parts are used.

Two transistors are connected as a conventional electronic multivibrator, or "flip-flop", to produce a square wave output at the desired pulse rate. When rotated, the "PULSE WIDTH" potentiometer varies the electrical balance within the multivibrator. One extreme of the control knob gives 20% signal on, 80% signal off, the other extreme 80% on, 20% off. Between these two

extremes any combination of intermediate percentages is available, center position of the "PULSE WIDTH" knob providing 50% signal on, 50% signal off. This position is normally used as control system neutral. The "TRIM" control effectively provides a fine tuning action around this neutral position.

A third transistor is used as a power device for maximum relay drive. Multivibrator circuit loading is eliminated and interaction reduced. Resulting operation closes and opens the relay contacts in an on-off percentage equal to that selected by the "PULSE WIDTH" control.

CONTROLS

Aircraft rudder position control is achieved by rotating the "PULSE WIDTH" knob. When control equipment in the aircraft is properly installed and connected, clockwise rotation of control knob will provide increasing amounts of right rudder, counterclockwise left rudder. Always begin flights with knob in neutral position.

The "TRIM" control knob turns the pulser on and off. After pulser is operating, rotate knob to set rudder trim.

The "FULL ON" pushbutton switch, when depressed, sends a steady control signal from the transmitter

SPECIFICATIONS

Operating Voltage	4.5 volts maximum, 3 volts minimum
Current Drain	25 ma average
Recommended Batteries	Eveready E-91 Alkaline Energizers
Expected Battery Life (E-91's)	8-10 hrs
Recommended Transmitter	CS-502 "Falcon"
Recommended Actuator	CS-506 "Septalette" or GM "Propomatic"
Control Percentages	20/80 - 80/20
Dimensions (Excluding knobs)	1 x 2-5/8 x 4-5/8 inches

regardless of pulser knob positions. Therefore, this button provides for normal escapement flying (pulser off) or can be used for "full right" rudder control of your proportional vehicle (pulser on). The "FULL OFF" button, when actuated, turns off the pulser and transmitted control signal to give "full left" proportional control or a "pulse omission" signal.

Control functions as described above are obtained when the airplane control mechanism is a device such as the "Septalette" magnetic actuator. When pulser is used with the GM "Propomatic" actuator, the two pushbuttons make possible selective directional operation of a control shaft for motor control or elevator trim action.

BATTERIES

Three self-contained batteries provide all power required for "Pulsi-Tran" operation. For long life, use Eveready E-91 Alkaline Energizers. As an alternate, use nickel-cadmium or standard pencils. Observe polarities when installing batteries in battery box. (Red is +). Check battery voltage occasionally with pulser on. Replace batteries when reading is 3 volts or less.

PREPARATION FOR USE

- a. Remove attaching screws, take off pulser back plate.
- b. Open transmitter on which pulser is to be mounted. Disconnect and remove the normal keying switch.
- c. Determine best mounting position of pulser back plate on front of transmitter. To obtain flush fit, mark and drill additional small holes in back plate to clear protruding screw heads on transmitter front.

NOTE

On C & S "Falcon" transmitter, position pulser back plate so top and right sides of both units are flush.

- d. Attach back plate securely to transmitter with bushing and nut (flange side forward).
- e. Install batteries in pulser battery box. Observe polarity. Be sure batteries are securely mounted and make good electrical contact. Check pulser operation.
- f. Cut the two white pulser wires to correct length, skin ends, slide through bushing, and solder to original switch connections.
- g. After final check of pulser and transmitter together, reassemble both units.

PULSE RATE ADJUSTMENT

Pulse rate of your "Pulsi-Tran" as received is 8-10 pulses per second. To change rate, proceed as follows:

- a. Disassemble pulser. Remove printed circuit board from case.
- b. Remove pulse rate resistor (see photo).

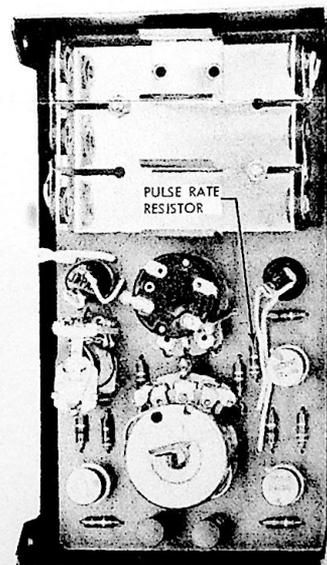
c. To decrease pulse rate, install higher value resistor (maximum 10,000 ohms). Reduce value to increase pulse rate (minimum 330 ohms).

d. Reassemble pulser after desired rate is obtained.

OPERATION

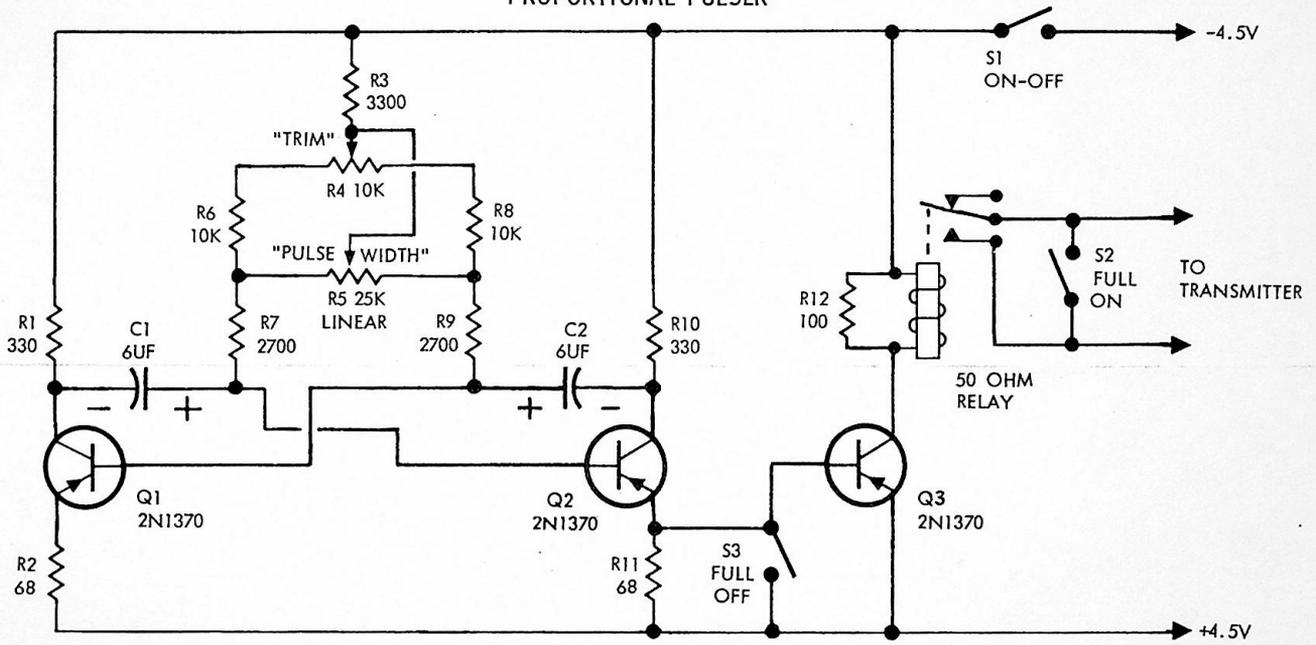
Below are several points which may aid in use of pulse equipment.

- a. When using Septalette actuator, smoother control will be obtained at higher pulse rates. However, control sensitivity may increase slightly.
- b. Some transmitters are not capable of keying properly at extremely high pulse rates - be sure to check your transmitter.
- c. When hand launching aircraft, one person may have to launch while the other operates controls to prevent overloading or blocking of receiver at close range.
- d. Before launch, check all control operations. Set "PULSE WIDTH" and "TRIM" controls to neutral.
- e. Overcontrol in flight should be expected at first - practice will overcome this. On first flights, turn control knob only to extent required to obtain shallow turns. Increase use of controls as flight experience is gained.
- f. A slight lag between control setting and flight attitude is normal. Learn to anticipate this, or overcontrol will result.
- g. Flight control sensitivity will increase with use of larger rudder areas, more rudder throw, and faster aircraft. Pulse aircraft for beginners should have low control sensitivity.



Interior View of Pulsi-Tran

CS-504 "PULSI-TRAN"
PROPORTIONAL PULSER



Pulsi-Tran Schematic Diagram

WARRANTY

This equipment (except vacuum tubes) is warranted by C & S Electronics to be free of defects in material and workmanship for a period of ninety days. However, this guarantee is void should the manufacturer judge the defect to be caused by abuse, crashes, over-voltage, incorrect battery polarity or other misuse by the customer.

Repairs within warranty will be provided at no cost to the user. Other repairs will be performed at a nominal charge of \$3.00 plus cost of parts. When damage occurs which is too extensive for repairs, unit replacement will be made at a cost to user equivalent to 65% of original retail price of equipment.

In event of trouble do not hesitate to return equipment to the factory for service or checkup. The C & S service policy is to perform minor checkups and adjustments whenever possible without charge; in short, to see that our equipment continues to give maximum performance.

When sending equipment to the factory for service or repairs, package it carefully and be sure to include return address. For equipment in warranty, include return postage and insurance, or it will be returned postage C.O.D. Equipment sent to the factory for repairs will be returned repairs and postage C.O.D.

In event of trouble, return unit direct to the repair station in Phoenix, Arizona, not to the dealer. Include sufficient return postage with equipment. This may save on C.O.D. charge. Equipment will be serviced and returned within 3 days.

Please fill in the following warranty form within 10 days and return it to the factory as a record of your equipment purchase. Warranty service will be performed only on equipment so covered.

Litho in U. S. A.

Cut along dotted line and mail warranty to C & S Electronics Repair Station

C & S Equipment Warranty

Purchasers Name: _____

Address: _____

Equipment: _____

Purchased From: _____ Date of Purchase: _____

Address: _____