

INSTRUCTIONS FOR OPERATION
OF
CITIZEN-SHIP 8 CHANNEL SELECTIVE
SUPERHETERODYNE MODEL KV-8 RECEIVER

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INDIANAPOLIS, INDIANA

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1. INSTRUCTIONS FOR INSTALLATION AND OPERATION OF MODEL
KV-8 RECEIVER

- A. Your CITIZEN-SHIP KV-8 Receiver is a highly selective, high quality, miniaturized all transistor superheterodyne 8 channel reed receiver with simultaneous operation of two channels. It will operate on any of the new FCC frequency assignments from 27.255 through 26.995 with no interference from a transmitter on any other of the five frequencies.
- B. This receiver is designed to operate with our MST-8 Transmitter. The transmitter must have the proper crystal inserted in the crystal holder and be tuned for the frequency which your receiver is adjusted to receive.
- C. The KV-8 Receiver is shipped adjusted and tuned for reception on the frequency which is stamped on the box and on the bottom of the case. The frequency of the crystal in the receiver is not the frequency at which the set will operate, since the receiver crystal is always 0.455mc lower than the frequency of the transmitter. Example: If you have a receiver tuned for 27.145, the receiver crystal should read 26.690 (i. e. $27.145 - .455 = 26.690$).

2. CRYSTALS AND SELECTION OF OPERATING FREQUENCY OF RECEIVER.

- A. If you desire to select another of the available 27mc frequencies, and feel that you can not or do not wish to do the work yourself, you may ship the set to CITIZEN-SHIP and we will exchange crystals and re-align and retest the set for \$2.50. (The receiver crystal is soldered in place, and although eyelets are provided to facilitate resoldering a different crystal, care must be used not to injure the circuit board.) Your transmitter will also need to have the crystal changed to match your receiver. Instructions with your CITIZEN-SHIP Transmitter describe how you can change crystals and retune the set with the use of a field strength meter. If you prefer to ship the set to us for this work, charges will be \$2.50 for it also. No transmitters other than CITIZEN-SHIP manufactured will be adjusted.
- B. Warning! It is absolutely essential to obtain crystals of the correct frequency and tolerance. Because of the selectivity of the receiver, the crystals must be ground to a tolerance of .0025%.
- C. Crystals must be used in pairs as follows:

TRANSMITTER CRYSTAL FREQ.	RECEIVER CRYSTAL FREQ.
27.255	26.800
27.195	26.740
27.145	26.690
27.095	26.640
27.045	26.590
26.995	26.540

3. MOUNTING RECEIVER.

- A. The receiver should be mounted vertically by enclosing it completely in one inch thick sponge rubber (all six sides so it is completely floating) with the bottom of the set (tuning side) toward the front of the plane. When so enclosed it will withstand very hard shocks or crashes. For crash protection, next most desirable position is horizontal mounting with relays up. This position, however, is the worst for sympathetic reed vibration with the engine running. Third choice is on side so reeds point up. Thin wire should be used to connect servos to the relays.

4. WIRING RECEIVER.

- A. Wiring the receiver is very simple as it uses only one 15 Volt hearing aid battery. (See Par. 5). Red wire is connected to the plus battery terminal and black wire to minus through an off-on single pole single throw switch. (See Figure 1.)

5. BATTERY REQUIREMENTS.

- A. Since the set is all transistorized, only a 15 Volt battery supply is required. (Do not use more than 15 Volts or transistors may be harmed.) Two types are currently available:

Burgess-K 10 or equivalent	Weight 1-3/4 oz.
Burgess U10 or Eveready 411	Weight 1-1/4 oz.

For extended life two batteries may be connected in parallel. Minus to minus and plus to plus.

- B. A plug and socket are provided for insertion between the set and batteries for easy removability of the set.

6. END USE OF BATTERIES.

- A. The battery should be replaced when voltage reaches 11 or 12 Volts with set on. Reduction in "B" voltage is easy to spot. When its voltage gets very low, simultaneous operation gets marginal, but single operation is still reliable.

7. ANTENNA.

- A. Several arrangements of antenna are possible. A stiff steel wire at least 18" long may be mounted vertically at any convenient point and the antenna lead from the receiver soldered directly to this. A wire may be stretched from the receiver to the top of the rudder fin. With a superheterodyne receiver the longer the antenna the better the operation. Use as long an antenna as possible. Leave some slack in the antenna lead into the receiver, but do not wind this lead in and around other wiring as range might be reduced.

8. RETUNING AND ADJUSTING.

- A. The KV-8 Receiver is tuned and adjusted at the factory. Only the antenna coil should be adjusted after installation in the plane and connected to the plane's antenna. This adjustment must be made with the set cover in place.

- B. Assuming that the proper voltages have been connected to the receiver, connect a pair of head phones from the green wire to ground (red wire) as shown in Figure 1. Make sure that the transmitter you are using is equipped with the correct crystal to go with the frequency of the receiver.
- C. With the transmitter turned on, you should hear a tone in the head phones when the operate stick is moved or the motor button pushed. If you hear nothing, recheck your crystal frequencies and make sure the set is wired properly. DON'T START ADJUSTING ALL THE COILS on the assumption that they are out of tune. We know they were properly adjusted at the factory.
- D. Using an all-bakelite screw driver or a wooden dowel sharpened to a wedge-shape, turn the antenna coil core back and forth until the loudest signal is heard. Now remove the antenna from the transmitter and place it as far away from the receiver as a signal can still be heard. This may be from 2 to 20 feet. Readjust the antenna coil for the loudest signal. See Figure 1 again for location of antenna coil adjustment.
- E. If the signal can be heard with the antenna out up to a foot or two, it is inadvisable to make any further adjustments. If, however, the set seems definitely weak, and this can only be ascertained on a distance check with the antenna in the transmitter, it is permissible to remove the cover from the set and readjust the IF coils for the loudest signal in the same manner that you adjusted the antenna coil. Never turn these cores more than an eighth of a turn, because if more adjustment than that is necessary it means the crystals are wrong. The antenna coil can be adjusted with the cover off, but it needs readjustment when the cover is put on, as the setting is different with the cover off and on for the antenna coil only.
- F. The oscillator coil should never need retuning unless the modeler elects to change crystals which are widely different from each other - such as from 27.255 to 26.995.

9. GENERAL INFORMATION.

- A. The normal function of this receiver is to give multiple and simultaneous control of a model aircraft and permits the use of rudder, ailerons, elevator and motor speed. (It is also possible, of course, to use this equipment in a model boat or car.)
- B. When used in a model plane with the functions listed above, experience dictates that certain reeds and associated relays be used for certain functions - particularly to obtain simultaneous operation of two control surfaces. They are as follows:

- Two highest tones (shortest) reeds - Rudder.
- Next two highest reeds - Ailerons.
- Two lowest tones (longest) reeds - Elevator.
- Next two lowest - Motor Speed.

Aileron and rudder relays may be interchanged if flying is primarily to be done with ailerons.

- C. See Figure 2 for identification of relays. The relays must be connected as shown in Figure 2 to conform to the nomenclature of the control stick and switches on the transmitter. The rudder or aileron relays theoretically can be operated simultaneously with the elevator and motor relays, but since the reeds of the ailerons and motor speed reeds are adjacent, this operation is marginal. However, it is inconceivable that it would ever be needed.
- D. Both positions of elevator will operate simultaneously with both positions of either rudder or ailerons. Also motor speed can be changed simultaneously with rudder.
- E. Rudder and ailerons cannot be had simultaneously, nor can elevator and motor. These are the reasons for using the arrangement described. (Further understanding of this can be had by reading the MST-8 Transmitter instructions.)
- F. The relays are double throw single pole for use with motor driven actuators (called servos). Escapements can also be used, but are not recommended where simultaneous is desired.
- G. The wiring diagrams of the servos are packed with them and will not be repeated here. See Figure 3 for nomenclature of relay contacts. CITIZEN-SHIP HRH Servos are recommended.
- H. It is doubtful if the relays will ever need adjustment.
- I. The reeds should not be adjusted unless made inoperative or unreliable by a crash landing. If a reed can be seen to be vibrating but its associated relay not closing, turn the tiny screw contact a half turn clockwise (do not screw in and out at random).

WARRANTY

Your CITIZEN-SHIP MODEL KV-8 Receiver is warranted by the manufacturer to be free from defects in material and workmanship. However, the transistors are known to be operative from testing of the set and we cannot guarantee them against damage caused by incorrect voltage.

Any receiver failing to operate within 30 days after date of purchase will be repaired or replaced free of charge upon being returned to the factory. This warranty does not apply to failure of operation due to exhausted or improper batteries.

If your receiver is damaged in shipment, you should file a claim with the carrier immediately upon noting the damage.

This warranty does not apply if, in our judgement, the receiver has been tampered with or received abusive treatment beyond that encountered in normal usage.

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WIRING DIAGRAM

FIG. 1

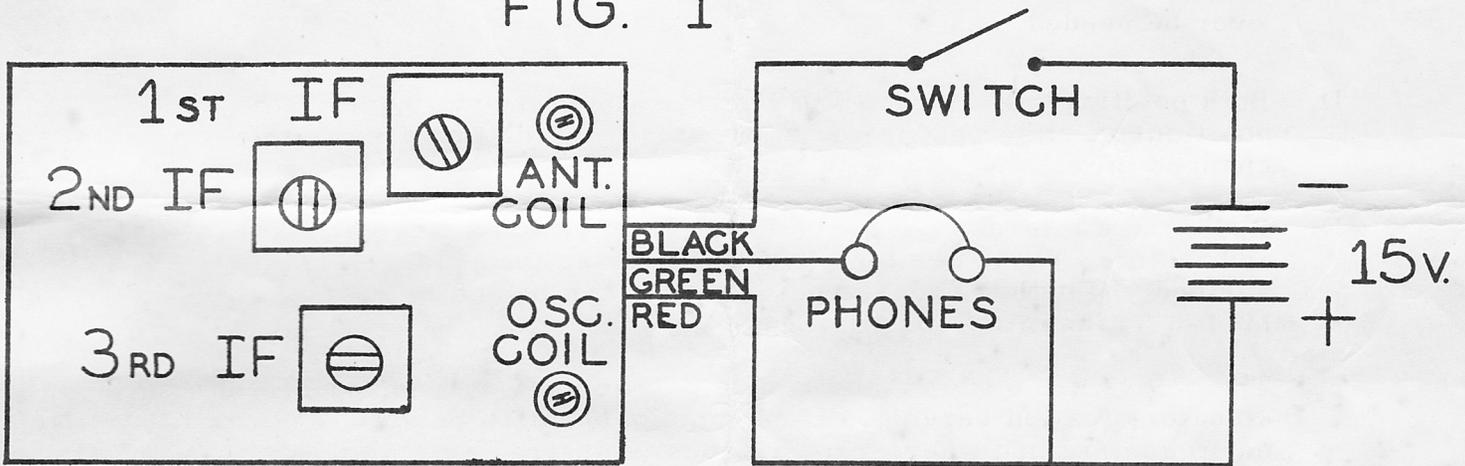


FIG. 2

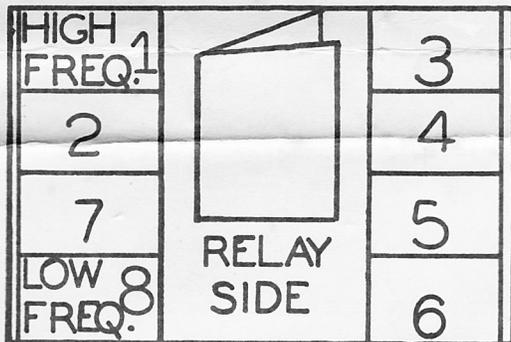
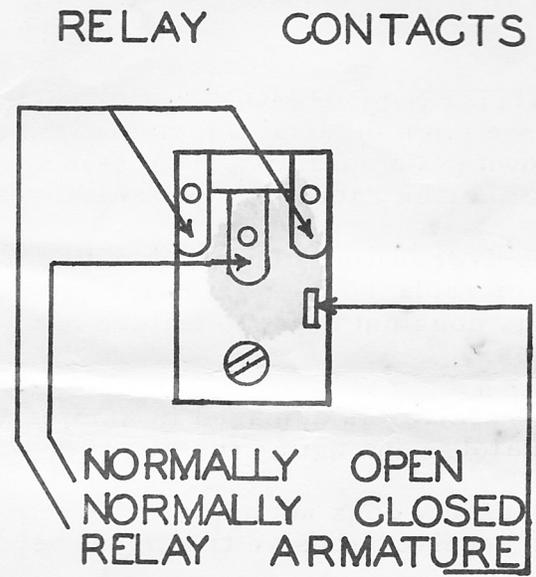


FIG. 3



- 1 RIGHT RUDDER
- 2 LEFT RUDDER
- 3 RIGHT AILERON
- 4 LEFT AILERON
- 5 HIGH MOTOR
- 6 LOW MOTOR
- 7 DOWN ELEVATOR
- 8 UP ELEVATOR