

INSTRUCTIONS FOR OPERATION
OF
CITIZEN-SHIP MODEL TMS MULTI TONE TRANSMITTER

CITIZEN-SHIP RADIO CORPORATION
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INDIANAPOLIS, INDIANA

INSTRUCTIONS FOR OPERATION
OF
CITIZEN-SHIP MODEL TMS MULTI TONE TRANSMITTER

Your CITIZEN-SHIP Model TMS 10 Channel Transmitter is a high power output, all transistorized unit capable of transmitting 10 different audio tones that operate the CITIZEN-SHIP Model ZR-10 Reed Receiver. Two tones may be signaled at the same time, allowing simultaneous operation of two control surfaces of a model aircraft.

These audio tones range from 350 to 700 cycles per second, and will operate all late model receivers with high tone reed banks. Elevator, motor and aileron tones match the Citizen-Ship RL-6 Reed Receiver.

The transmitter is crystal controlled and intended for use on all of the 27mc Citizens Band frequencies of operation. It may be used on any of the 6 following frequencies by inserting the desired frequency crystal. The legal frequencies for operation on radio control on the Citizens Band are as follow:

26.995mc	27.145mc
27.045mc	27.195mc
27.095mc	27.255mc

All RF tuning adjustments have been completed at the factory using the crystal with which the set is shipped, and it is doubtful if they need readjustment even if the crystal frequency is changed. However, tuning instructions are briefly described in the paragraph on retuning.

INSTRUCTIONS FOR PUTTING TRANSMITTER IN OPERATION

Unpack carefully and note that the antenna assembly is in two pieces: a short fixed length of antenna with a loading coil mounted on one end, and a collapsible antenna which is compressed to its shortest length as packed. Insert the fixed length antenna through the rubber grommet in the top and screw onto the screw provided on the antenna mounting bracket. With the back cover off this bracket is readily seen from the side. Then screw in the threaded end of the collapsible antenna into the fitting on the top of the loading coil. Part or all of the antenna assembly can be removed from the set for convenience in transportation, or it can be left in place with the antenna collapsed. When flying, the collapsible antenna must be extended to its full length.

BATTERY REQUIREMENTS

One of the advantages of this transmitter is the fact that it does not require an expensive power unit, but uses a 9 Volt battery. This battery voltage has been set up as a standard of the industry by transistor manufacturers.

The 9 Volt battery is selected in order to obtain from this transmitter a signal which is equal in strength to that radiated by proven tube transmitters. This strong signal insures no reduction in range or concern about loss of control at a distance. The drain from a 9 Volt battery is approximately 60 MA with tone on.

The recommended battery is Eveready Energizer #2356. This battery fits into the bottom of the case lying flat, and a cardboard spacer is provided to fill up the remaining space.

Another battery that can be used is the Burgess C6X. For extended battery life two of these batteries may be used, as adequate space is provided. It would require that a parallel battery clip be connected across the one already provided in the set.

Still another battery that will go in the space is the Eveready #276. Unfortunately, this battery has terminals with wider spacing than the above-mentioned batteries, and it would be necessary to cut in half the paper insulator on which the clips are mounted. If this is done, care must be taken not to cut the wires which run inside the paper. When this paper has been cut, the two clips can be moved out to the wider spacing required by the #276.

Check battery voltage periodically. The transmitter is designed to work most efficiently at 9 Volts, but will continue to function to approximately 7 Volts and even lower, with of course, reduced output. Remember that

the output of any transmitter is proportionate to the square of the voltage. That is, if the voltage drops to 1/2, the power output drops to 1/4. Do not take chances with extremely low battery voltages. It is recommended that battery be changed when voltage reaches 7-1/2 - 8 Volts with the set turned on.

OPERATION WITH RECEIVER

The reeds in the receiver are very sharply tuned, and the audio tone from the transmitter must be extremely stable and not drift off frequency. The audio tone generators in this transmitter are temperature compensated by special capacitors and inductors to hold their frequency within about 1 cycle from freezing temperatures to 140° Fahrenheit. This high temperature is sometimes encountered in the summer when transmitters are placed on hot runways.

At the top rear of the transmitter are 10 volume control shafts with screw driver slots visible through holes. These controls permit variation of the audio tones to match the individual reeds of the receiver. They are arranged for maximum convenience if the receiver is connected in accordance with the instructions packed with it, and are shown in the associated figure. Once set, they should rarely need to be retuned.

If some other arrangement of connecting the reeds is used, the following chart identifies the control used with the 10 various audio tones:

1. Right Rudder - Highest Tone.
2. Left Rudder.
3. Right Ailerons.
4. Left Ailerons.
5. High Motor
6. Low Motor.
7. Down Elevator.
8. Up Elevator.
9. Down Trim
10. Up Trim - Lowest Tone.

The first four tones (high frequencies) are produced by the audio transformer to the left (rear view) and the last six (low frequencies) by the transformer to the right.

Any one of the first four frequencies should theoretically produce simultaneous operation of the reeds with any of the last six, but practically adjacent reeds will not work simultaneously. However, with the arrangement suggested, it is inconceivable that motor speed would need to be changed during a maneuver using ailerons. If any two controls produced by one audio transformer are signaled together, neither control will be obtained.

Action of the lever switches gives control as indicated by the printing on the front panel. Tune in the reeds by rotating the correct control for best operation. An adjacent reed may sometimes be tuned in, so be sure the correct reed is vibrating by checking the servo or actuator motion associated with the control.

Now check simultaneous operation of rudder and elevator. It may be found that one of the actuators fails to function. Retune this control until simultaneous operation occurs. Sometimes beats occur between reeds, causing alternate dropping in and out of one actuator. Retune the OTHER control very slightly to eliminate the beat, but not enough to cause this actuator to drop out. Also, check simultaneous Aileron and Elevator control. Retune controls if necessary.

Tuning of controls may be done while signaling simultaneous signals. This is a rapid and accurate method. Width of control tuning to give simultaneous operation will be much less than that which will give single or one reed operation.

If a step-type servo or escapement is used for motor speed, the motor switch will be used in only one direction. It is intended, however, that a trimmable servo be used, as generally they give far more satisfactory operation.

RETUNING THE RF SECTION OF THE TRANSMITTER

If the crystal frequency is changed, and for some reason a distance check does not show good range, or if range is

Don't make the following adjustments except as a last resort:

If a control adjustment fails to reach a reed frequency when in maximum clockwise or counter-clockwise position, it is possible to readjust the transformer air gap by means of the screw to bring it in.

CAUTION: This will shift all four or six frequencies associated with this transformer. From rear view, the left transformer shifts high tones, right transformer shifts low tones. Closing the air gap lowers the frequencies, increasing raises. A quarter turn of the screw is generally enough. If you adjust this, mark the screw so you can get back to where you started, as it is easy to get confused. This is normally a factory adjustment.

WARRANTY

Your CITIZEN-SHIP TMS Transmitter is warranted by the manufacturer to be free from defects in material and workmanship. Any transmitter 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 transmitter 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 transmitter has been tampered with or received abusive treatment beyond that encountered in normal usage.

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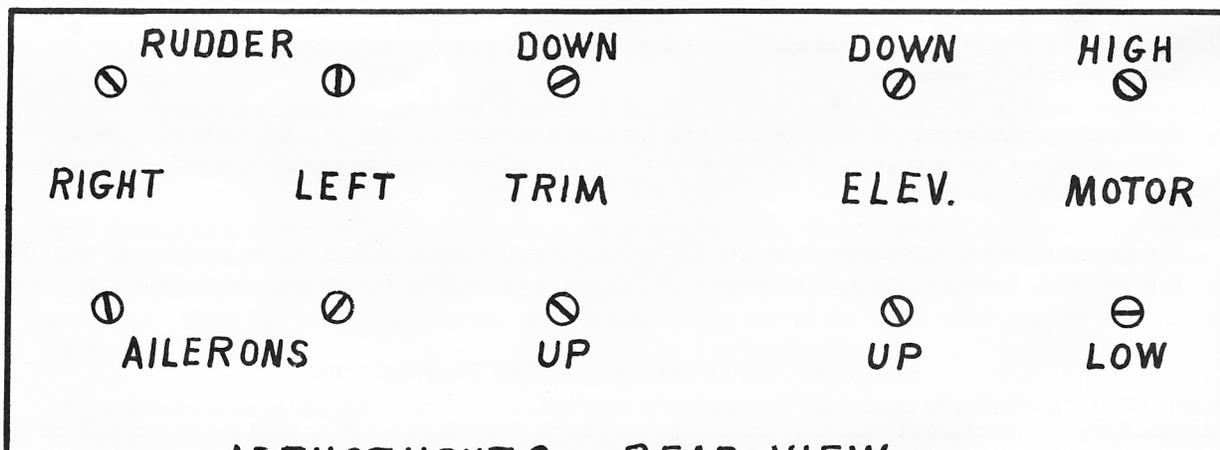
LICENSING

CAUTION: Before this transmitter can be operated, it must be licensed as a Class C Station in the Citizens Radio Service.

FCC Form #505 Application for Citizens Radio License is enclosed with this transmitter. Instructions on the front page are to be carefully followed in filling out the application.

In general, the only requirements for a Citizens Radio Station License with the CITIZEN-SHIP Transmitter are that the applicant be 12 years of age or older and a citizen of the United States. If some one under 12 wishes to purchase and use the transmitter, he may have his father or another adult file application for the license. After the Citizens Radio Station license has been obtained, anyone may operate the transmitter as long as the licensee assumes the responsibility for the proper operation of the station.

Do not operate your transmitter until you have received your Citizens Radio Station license.



ADJUSTMENTS - REAR VIEW

