

INSTRUCTIONS FOR OPERATION  
OF  
CITIZEN-SHIP MODEL MST-8 TRANSMITTER

CITIZEN-SHIP RADIO CORPORATION  
820 East 64th Street  
Indianapolis, Indiana

## INSTRUCTIONS FOR USE OF MODEL MST-8 TRANSMITTER

### DESCRIPTION

Your CITIZEN-SHIP Model MST-8 Transmitter uses a high output MOPA circuit which can be modulated with either one or two highly stable audio tones to achieve simultaneous operation of two control surfaces of a model aircraft through the use of the CITIZEN-SHIP MSR-8 or SS-MSR-8 multi-channel simultaneous receiver. This transmitter is crystal controlled and intended for use with all the 27mc frequencies.

### FREQUENCIES OF OPERATION

It may be used on any of the six following frequencies by plugging in the desired frequency crystal and very slightly retuning the oscillator adjustment:

27.255	27.095
27.195	27.045
27.145	26.995

All RF tuning adjustments have been completed at the factory using the crystal with which the set is shipped and should not be changed if you wish to continue using transmitter on this frequency.

### INSTRUCTIONS FOR RETUNING IF CHANGING CRYSTAL

**CAUTION:** This adjustment must be done using a Field Strength Meter.

The brass screw above the crystal tunes in the oscillator. The compression trimmer above it tunes the output tank circuit and the brass screw to the left of the trimmer tunes the antenna. Never change any of these adjustments without the aid of a Field Strength Meter. To change frequency, plug in desired crystal and retune only the oscillator adjustment to give the optimum output on the Field Strength Meter. Now back out (counter-clockwise) 1/4 turn as a safety factor.

If you cannot obtain the proper crystal you wish to use or feel you do not wish to make the change yourself, return the unit to the factory with a note stating your wishes. A minimum charge of \$2.50 will be made which includes the crystal trade.

### ASSEMBLY

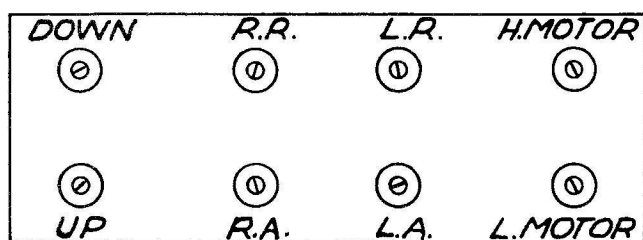
Batteries required are two 67-1/2 Volt B batteries Burgess type XX45 or Eveready #467, and one 1-1/2 Volt Burgess type 4F or Eveready type #742. Filament current is only 300 M.A. and plate current 20 M.A.

The cardboard packing inside the transmitter is to be used around the batteries to keep them from shifting. Stapled to this packing you will find a cellophane envelope containing 4 screws for the transmitter case and 2 switch handles. Attach the handles to their respective switches using glue on the plastic handle to avoid loss.

Screw the antenna into the stud provided below the hole in the top of the cabinet and extend to full length for flying. Testing can be done with the antenna collapsed.

### OPERATION

Since the reeds used in the receiver are very sharply tuned, the audio tone from the transmitter must be extremely stable and not drift off frequency. This circuit used in the MST-8 is being used in a well-known electronic organ and is probably the most stable circuit that can be produced for this application. Once set, it should stay tuned for weeks.



In the rear of the transmitter at the top are 8 controls accessible through holes in the back cover which permit the audio tones to be tuned exactly to the reeds in the receiver. They are arranged for maximum convenience if the receiver is connected in accordance with the instructions packed with it and are shown here.

If some other arrangement of connecting the reeds is used, the following chart identifies the frequency:

UP - Lowest reed.  
DOWN - Next lowest.  
LOW MOTOR - Low intermediate.  
HIGH MOTOR - Next low intermediate.  
LEFT AILERONS - Next high intermediate.  
RIGHT AILERONS - High intermediate.  
LEFT RUDDER - Next highest reed.  
RIGHT RUDDER - Highest reed.

The first four low frequencies are produced by the audio transformer to the left (rear view) and the last four, or high 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 four, but practically adjacent reeds will not work simultaneously, but with the arrangement suggested it is inconceivable that motor speed would need to be changed during a maneuver using ailerons. If motor and elevator are signaled together, neither control will be obtained as both of these controls are produced by one audio transformer.

Move the control stick in the direction indicated by the printing on the front panel (right for right rudder, down for up elevator) and tune in the reeds by rotating the correct control for best operation. The high frequency reeds are very broad and may even tune in an adjacent reed, so be sure the correct reed is vibrating by checking the servo or actuator action associated with that control.

Next move the control stick to one of the corners to check simultaneous operation (lower right is right rudder and up 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. Detune the OTHER control very slightly to eliminate the beat but not enough to cause this actuator to drop out.

To tune the ailerons, push up the switch to left of center and the stick will now operate the ailerons instead of the rudder. Proceed as above and also check simultaneous with the elevators as above.

If a step type servo or escapement is used for motor speed, only one motor button is needed. When using both buttons, a trimmable servo is a necessity.

Check battery voltages periodically. The transmitter will work with B voltages as low as 80 Volts (down from 135), but range may be decreased.

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 nut to bring it in. CAUTION: This will shift all four frequencies associated with this transformer as listed in first Paragraph at top of this page. Closing the gap lowers the frequencies, increasing raises. A quarter turn of the nut is generally enough. If you adjust this, mark the nut 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 MST-8 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. 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 a boy 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 responsibility for the proper operation of the station. It is quite simple to obtain a Citizens Radio License, and complete information is contained in Part 19, FCC Rules and Regulations. This publication may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. at a cost of 5¢ per copy (do not send stamps). An application blank, FCC Form 505, is enclosed for your station license. This form should be filled out and sent to your nearest FCC Field Office. Additional forms may be obtained from your FCC Field Office or from the Federal Communications Commission, Washington 25, D.C. Do not operate your transmitter until you have received your Citizens Radio Station License.

The enclosed forms should be filled in and sent to your nearest Field Engineering Office. A list of the Field Engineering Offices is as follows:-

District No. 1	Customhouse, Boston, Mass.
District No. 2	Federal Building, New York City.
District No. 3	U.S. Customhouse, Philadelphia, Pa.
District No. 4	Old Town Bank Building, Baltimore, Md.
District No. 5	New Post Office Bldg., Norfolk, Virginia.
District No. 6	Federal Annex, Atlanta, Ga. Suboffice, Post Office Bldg., Savannah, Ga.
District No. 7	Federal Bldg., Miami, Florida. Suboffice, Post Office Bldg., Tampa, Fla.
District No. 8	Audubon Bldg., New Orleans, La. Suboffice, U.S. Courthouse & Customhouse, Mobile, Ala.
District No. 9	U.S. Appraisers Bldg., Houston, Tex. Suboffice, U.S. Post Office Bldg., Beaumont, Tex.
District No. 10	U.S. Terminal Annex Bldg., Dallas, Texas.
District No. 11	Post Office & Courthouse Bldg., Los Angeles, Cal. Suboffice, U.S. Customhouse, San Diego, Cal.
District No. 12	Customhouse, San Francisco, Cal.
District No. 13	Central Bldg., Portland, Ore.
District No. 14	Federal Office Bldg., Seattle, Washington.
District No. 15	Customhouse, Denver, Colo.
District No. 16	Uptown Post Office & Federal Courts Bldg., St. Paul, Minn.
District No. 17	U.S. Courthouse, Kansas City, Mo.
District No. 18	U.S. Courthouse, Chicago, Ill.
District No. 19	New Federal Bldg., Detroit, Mich.
District No. 20	U.S. Postoffice, Buffalo, New York.
District No. 21	Stangenwald Bldg., Honolulu, T.H.
District No. 22	Federal Bldg., San Juan, Puerto Rico.
District No. 23	Shattuck Bldg., Juneau, Alaska, Suboffice, U.S. Postoffice & Courthouse, Anchorage, Alaska.