INSTRUCTIONS FOR: "POWERMITE" MULTI CHANNEL ALL TRANSISTOR TRANSMITTER

SIMULTANEOUS AND NON-SIMULTANEOUS TYPES

GENERAL INFORMATION

The Min-X all transistor transmitter represents a new step forward in the radio control field. The transmitter features light weight and convenient size; high output and low battery drain. It has been designed as a companion unit to the new MIN-X Superhet reed type receiver, and when used with this receiver the transmitter will give superior and out standing performance.

The circuitry is composed of 5 transistors and employs silicon transistors in all critical areas for maximum stability and performance. The modulation section provides maximum reed drive under all operating conditions and voltages. A newly designed, extremely small center loaded antenna is employed to give maximum output and range.

Lever switches located on the front panel (identified in the pictorial, twelve channel also has two push buttons) key each channel or control. For each channel there is an adjustment potentiometer that allows a small amount of tone adjustment for fine tuning to the receiver reed. All transmitters are factory tailored, tuned, and matched to the companion receiver. Tailoring is the process of adding the proper capacitance across the tuned circuit of each channel to match the frequency of each reed of your particular reed bank.

To help you understand the need of individual tailoring, there are certain facts you should know. In the manufacture of reed banks and other parts making up the entire system, there are component tolerances. It is these tolerances that make tailoring a necessity. For example, receiver reed banks vary a little as to their exact operating frequency. The resonant frequency may vary as much as 5 cycles per second for the same reed of different banks. Also, a reed has a very high tuning Q. This means a reed will only vibrate properly at a tolerance of 1 to 2 cycles from its exact tuned frequency. Because of this high Q, the transmitter tone oscillators, from which the reed is operated, must be of a very stable design frequency-wise. This has been accomplished in the MIN-X transmitter by use of toroid inductors and temperature stable capacitors. The trim adjustment pots for each channel have only a small "range" of frequency. This is about 10 CPS on the highest frequency channel to about 30 CPS on the lowest channel. The facts presented above, such as stability and small frequency control, coupled with the tolerances of reed banks and tolerances of components used in the transmitter dictate the need of individual tailoring. We could, by increasing certain costs, eliminate some of these tolerances, but from an overall practical viewpoint, the system we use is the best. To create a perfect match between transmitter and receiver, we employ individual tailoring.

BATTERY REQUIREMENTS

The transmitter operates from a single 9 volt battery with snap connector attachment terminals. Recommended types are the Burgess D-6, Eveready 276 or RCA VS 306. The use of any other size or type of battery is not recommended. Normal life on the recommended battery will be from 40 to 60 hours of operating time. This will probably be a full years' operation for the average modeller. Even the most active user will not consume more than three batteries in a year. Due to the long life of the dry battery the use of rechargable type cells is neither necessary nor recommended. The battery should be replaced when it reaches 7.5 volts under load. That is with the switch on and two tones keyed.

INITIAL OPERATION

With the battery on its side connect to the battery snaps provided. Improper hook up is prevented by the polarity of the snaps. Slide the battery into the bracket and mount the antenna to the top of the case.

At this point the receiver should be put into operation. (Refer to receiver instructions.) After the receiver has been put into operation the transmitter may be checked against the receiver for proper operation. Since the units are a matched pair very little if any re-adjustment should be required. Note: All short range and shop testing should be done with the transmitter antenna collapsed to prevent receiver overload. Key each tone and note if the reed responds. If so proceed to install and check servos for simultaneous operation.

If fine tuning of the audio section is required, the pot adjustment allows about 10 cycles of swing on the high tones and 30 cycles on the low tones. You may note when adjusting the up elevator pot that one or two reeds can be tuned in. This is normal because it is the highest frequency channel. As you progressively go to the lower frequencies, aligment becomes less critial.

For best keying and starting characteristics, reeds should be tuned slightly on the low frequency side of maximum drive. Rotate the pot until the tone goes above the reed. Now restart the tone and slowly bring the pot back counter-clockwise, noting the point where the reed starts and then go slightly lower for best reliability. The upper row of pots rotate clockwise to lower tone. The lower row rotates counter-clockwise to lower tone.

Simultaneous operation (six channel is not simultaneous) may require further fine adjustment. While holding one control on the left side of the transmitter start each control on the right side noting reed response of the second control. Adjust each pot on the right side until clean starting is achieved. Generally a slight rotation will be required (lower tone). After the right side is tuned reverse the procedure holding one control on the right and checking each control on the left. Make necessary adjustments as you go.

The transmitter tones are now tuned to the receiver reeds and single or simultaneous control (except [illegible]el) is available by operating any of the levers on the left side of the panel with any of the levers on the right side. You will find that one simultaneous combination in the middle of the reed bank may cause the reeds to chatter. This is because the two reeds are side by side. (Right aileron and down trim.) This should not cause any trouble since these two controls are rarely used at the same instant while flying. The controls that are most important to have good simul operation on, are left and right rudder with up elevator (to execute spins) and left and right aileron with up and down elevator for rolls. Most other combinations are of secondary importance.

MAINTENANCE NOTES

Periodically, it is recommended that the operation of the lever switches be checked. This is done by listening to the tone on a monitor as the switch is very slowly keyed. Normally, only one tone should be heard, but sometimes a quick different tone is heard before the proper tone appears. This is a higher frequency and in some cases can cause unwanted momentary operation of another reed. This means your switch is out of adjustment. Each side of the lever switch accomplishes two functions when keyed, but in a normal sequence. Being a DPST unit for each channel, one set of points closes first to put the proper tone capacitance in the circuit, then another set closes to turn the oscillator on. If this action is reversed and the oscillator is turned on before adding the proper capacitance, the other momentary tone is generated. To re-adjust, remove the back of the case and note action of affected switch as it is keyed. Reposition the switch contact leaves to obtain proper sequence and operation. Remove battery before making any adjustment.

The nylon rub element of the switch was initially lubricated at the factory to insure a smooth, non-sticking key action. Possibly in the future, this may require re-lubrication. If so, use VASELINE, but only a very small amount at the point where rub elements contact the springs. Over-lubrication will invite trouble due to dirt collection. Also, periodically inspect electrical contact points for dust and foreign matter. If they appear dirty, clean with a contact burnishing tool.

Under normal circumstances, the R.F. section of this transmitter should never require retuning. However, if you have reason to believe it is not on frequency, or its output is weak, it is best to have it checked. Shipping damage and rough handling are major causes of detuning, but whatever the cause, we must remind you, that retuning and adjustment to the R.F. oscillator can only be accomplished by AUTHORIZED PERSONS. As to R.F. amplifier tuning, this can be accomplished without affecting frequency output and will allow you to peak the power output. With the transmitter standing on a table and the antenna fully extended, turn the transmitter on and place a field strength meter at a point where about 1/2 scale reading is indicated. Key a control and beginning with the lower output trimmer slowly adjust for maximum output. Then adjust the upper trimmer, then the lower trimmer again. Keep alternating from one to the other until maximum signal is indicated. The output network is of the Pi type and adjustment of one trimmer affects the other. Therefore alternating from one to the other is necessary. (Refer to pictorial for trimmer location.) Make above adjustments with one hand on the case.

WARRANTY AND SERVICE

All MIN-X equipment is completely checked and tuned before leaving the factory. Rigid requirements as to output and modulation must be met by each unit before final packaging. However, it is entirely possible that a defective component may not appear until after the unit has been in use. To cover such possibilities all transmitters are fully warranted against defective material and workmanship for a period of 90 days, from the date of purchase. Malfunction of any product as a result of reversed voltage, physical damage, re-working, altering or tampering AUTOMATICALLY EXCLUDE IT FROM THE PROTECTION OF THIS WARRANTY.

TRANSISTORS AND CRYSTALS DUE TO THEIR DELICATE NATURE, CANNOT BE COVERED UNDER THIS WARRANTY. The warranty slip included with the transmitter must be on file before any requests for service will be recognized. This warranty applies only to the original purchaser.

When service is required, transmitter, transmitter antenna and receiver should be returned to the factory. Since all units are individually matched, service on one is impossible without the other. When returning, units should be very carefully packaged to insure their safe arrival. At least 3" of packing on all sides. Extra care should be taken to package inside the transmitter. Do not include batteries. Be sure your units are properly labeled for identification purposes and are accompanied by a letter stating the nature of the problem. All units will be returned C.O.D. and service returns will be handeled with all possible promptness.

NOTE: Operation of this transmitting device without proper F.C.C. license is illegal. This examination free license form may be obtained from the local F.C.C. district office for your area only. Request form No. 505-A.

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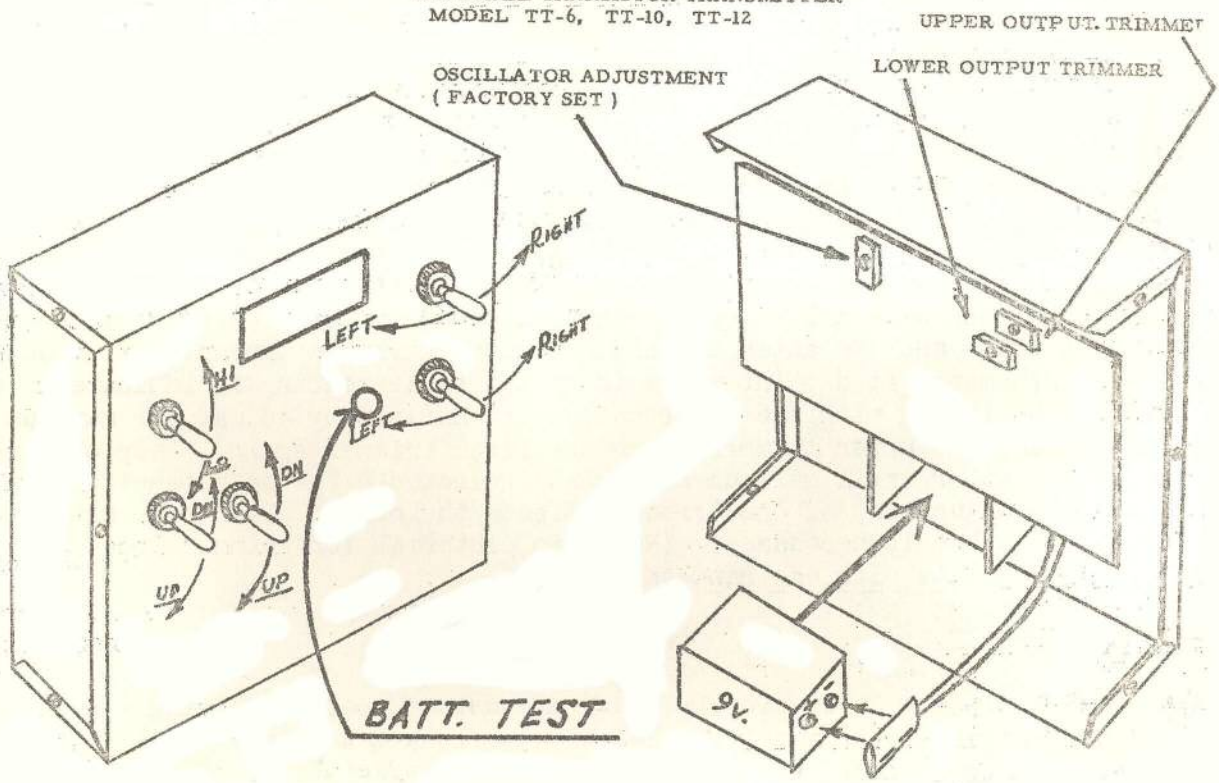
INSTRUCTIONS FOR "POWERMITE" MULTI

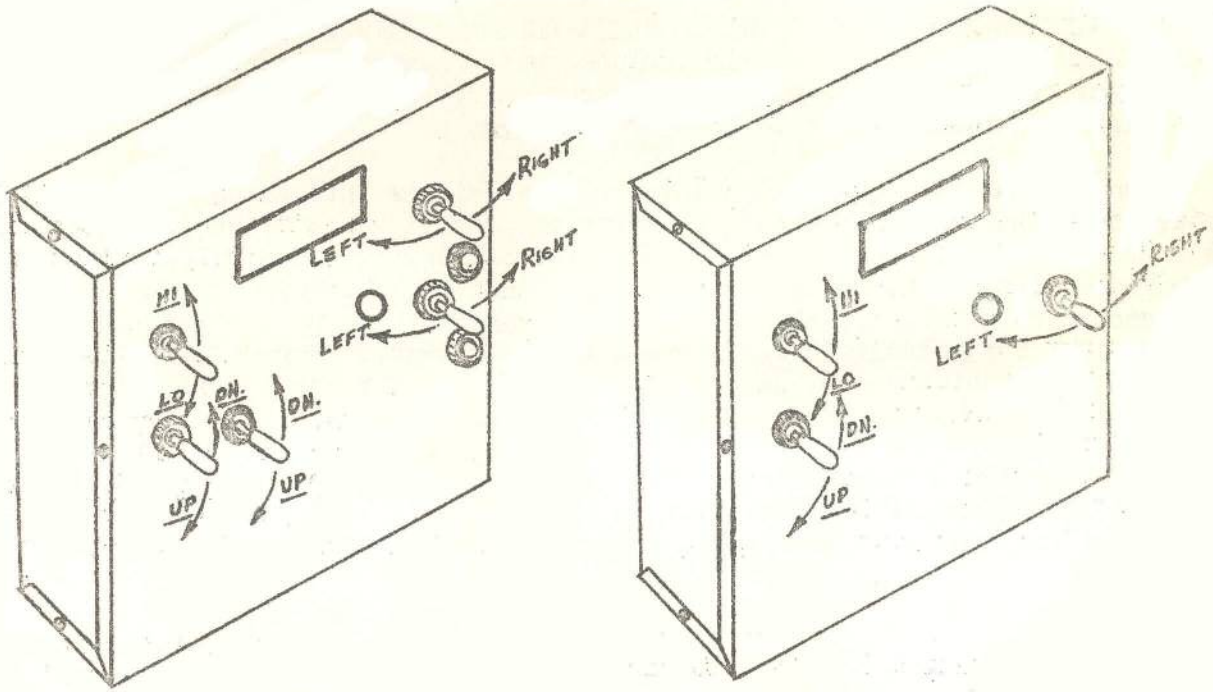
MIN-X ALL TRANSISTOR TRANSMITTER
MODEL TT-6, TT-10, TT-12



TEN CHANNEL

INSIDE REAR VIEW

MIN-X ALL TRANSISTOR TRANSMITTER



TWELVE CHANNEL

SIX CHANNEL

METER AND BATTERY TEST SUPPLEMENT FOR

MIN-X TRANSISTORIZED "POWERMITE" MULTI-CHANNEL TRANSMITTERS

Your new high output transistorized transmitter has been equipped with a precision meter for monitoring R.F. output and also for checking battery voltage.

This meter was selected because of its ease of readability and also because it has a higher degree of accuracy than most meters now being used in the industry (5% as compared to 20%).

The meter reading will vary without antenna, with antenna collasped and with antenna extended as you will note. We have set the meter at the factory to read approximately half scale when you are holding the transmitter in both hands as you would normally do when flying. The change in meter reading with hand capacity and with keying is normal and need not be of any concern.

Battery checks should be made by depressing battery test button located on transmitter face (just to the right of the on-off switch). The transmitter should be in a vertical position (switch on) so that the meter is in the attitude for which it was designed to work most accurately. A check of the battery voltage when new will give you a good reference on future checks.

We suggest replacement at approximately 7.5 volts as the range is proportional to the voltage.

6364

MIN-X RADIO, INC.