

INTRODUCTION

KRAFT Custom multi-channel reed transmitters are the finest units available for radio control. They combine the highest radiated RF output with exceptional efficiency for long battery life. The tone oscillators provide almost perfect tone stability over a wide voltage range and temperatures from 0° to 140° F. Once matched to the receiver's reed bank, retuning of the transmitters tone control potentiometers will not be required except when indicated by changes in the reed bank itself.

Only the finest components have been utilized to provide outstanding performance and long trouble-free service. Silicon transistors, tantalum electrolytic capacitors, and mylar tone control capacitors are used throughout. The tone switches have palladium bar contacts to minimize switch troubles. This great care in component selection, combined with unequalled workmanship, results in a product of true custom quality.

SPECIFICATIONS

Total Current Drain - 60-70 milliamperes
RF Input to final - 400 milliwatts
Modulation 330 - 650 cps (depending on number of channels) sine wave at 90%
Antenna - Base loaded 54" whip

RF AND BATTERY VOLTAGE METER (10 and 12 channel only)

The meter reads relative RF output whenever the transmitter is on and the antenna extended. However, this is only a relative indication and ~~does not have any real relationship with the actual output of the transmitter.~~

A push button is provided to switch the meter to read approximate battery voltage during operation.

BATTERIES

One Burgess D6, Eveready 276, or RCA VS706 nine volt battery is required. The battery should be replaced when it drops to 7.5 volts with transmitter switched on. Wedge battery in place with a small piece of foam rubber between battery and battery bracket.

ANTENNA

The center loaded antenna is no longer used on KRAFT transmitters. Experience has indicated that their characteristics are undesirable for hand-held radio controlled transmitters because:

1. If the center loaded antenna is not fully extended, or if it happens to fall back through the loading coil, the transmitter's output is very seriously reduced.
2. The RF radiation pattern from the center loaded antenna is poor because of the strong null off of the tip. In other words, the center loaded antenna is quite directional.

The base loaded 54" whip antenna now supplied produces approximately the same output as with the center loaded antenna but with none of the disadvantages previously noted.

TUNING

The transmitter RF tuning adjustments have been set for optimum performance at the factory. They will never require retuning in normal service and it is most important that no attempt be made by the purchaser to make any adjustments other than specified in the following section covering tone controls. Any attempt at adjustment other than specified voids the guarantee and may necessitate expensive repairs.

ADJUSTMENT OF TONE CONTROLS

The transmitter's lever switches operate two controls each. The switches close contacts connected to a capacitor. A potentiometer and capacitor across each of these capacitors provide a fine tuning adjustment to allow tuning to the receiver's reed bank.

These tuning potentiometers are located on the back of the transmitter's printed circuit board and are identified to match the control functions operated by the lever switches. Rotating the blue knobs clockwise raises the tone frequency applicable to that particular control. Rotating the control potentiometer counterclockwise lowers the tone frequency.

Transmitters purchased separately will tune to the average reed bank of the type used in our receiver. However, because reed banks vary in tone frequency range, the transmitter tone adjustments may not cover all reed banks even of the same manufacturer and may require minor tuning capacitor changes. For this reason, it is always desirable to purchase matched transmitters and receivers.

All KRAFT reed transmitters, except the four channel, are simultaneous. This means that two control functions may be obtained at the same time. The controls are arranged so that the left hand control switches may be used simultaneously with the right hand switches. However, two switches on the same side of the transmitter may not be used together.

Adjacent reeds do not operate well simultaneously. Therefore, certain simultaneous combinations will not operate smoothly. On the ten channel units, aileron and motor controls operate adjacent reeds. On the twelve channel, auxiliary and motor operate adjacent reeds, and on the six channel, motor and rudder operate adjacent reeds. These functions are not normally used in flying and this is the reason the reed selection has been made to allow good simultaneous operation of the controls which are sometimes used together.

The reed bank has metal fingers equal to the number of "channels". These together are called the reed comb. This reed comb is mounted above a coil and a magnet. When an alternating current is introduced in the coil at a frequency equal to the resonant frequency of a metal reed finger, the finger will vibrate. When it vibrates, it hits the upper adjustable screw contact acting as a vibrating switch. The magnet of the reed bank provides a magnetic bias which improves reed drive in a manner similar to the principle used in the magnetic speaker commonly found in your home radio. While it would appear that the frequency of the metal finger of the reed bank would be determined solely by its length, this is not true. The frequency of a reed is primarily determined by its length, but it is also influenced by the distance between the reed and the pole piece on which the reed coil is wound. In production of the reed bank, stresses are introduced in the metal reed fingers. As the reed bank is used, these stresses tend to relieve, and the position of the reed in relation to the reed pole piece as well as the adjustable screw contact change. The closer the reed finger is to the pole piece of the reed coil the lower its resonant frequency will be, and the harder it will drive. The further away it is, the higher its frequency and the weaker its drive. Consequently, changes in the relationship between the reed comb and the pole piece will change the frequency response of the reed bank and may necessitate retuning.

In extreme cases, the gap between the reed and reed adjusting screw may also require readjustment. It is very important to note, however, that the gap between the adjustment screw and the reed does not influence the reed's frequency. It does, however, affect the starting ability of the reed and its dwell time, and has a decided effect on operation. Minor reed adjustment may be required from time to time. The gap between the reed and reed adjustment screw should be checked with the reed vibrating to observe the distance of the reed swing. This swing will be smaller for the shorter reeds and wider for the long ones. Normal swing observed at the end of the reed will be approximately 1/32" to 3/54" for the short reeds, and 3/64" to 1/16" for the long reeds. Excessively close spacing will result in poor reed response (slow starting) and poor simultaneous operation.

With the reed spacing approximately correct, the next step is tuning the transmitter to the reeds. This is done in the following manner. If reed operation is good simultaneously, it naturally will always be correct for non-simultaneous operation. Therefore, reed tune up should be done while holding simultaneous controls. For example, hold left rudder and up elevator. Rotate the up elevator control potentiometer to the right to increase the reed frequency. Key the up elevator switch as the potentiometer is rotated until the reed does not start. Then holding the up elevator switch, rotate the control potentiometer slowly back counterclockwise, or to the left, until the up elevator reed starts again. Continue rotating to the left slightly beyond this point. Repeat this process now with the left rudder control potentiometer and with the up elevator switch held on. This tuning adjustment should be repeated for every simultaneous combination. Once the reed bank has been tuned in this manner the various controls should be actuated together simultaneously and the reed action observed carefully. There may sometimes be slight interaction during simultaneous operation of two reeds with a third reed. Slight retuning of the combination causing the interaction will be necessary to eliminate it.

During adjustment of the reed bank, servos should be disconnected. In the case of matched combinations, the reed bank has been very carefully adjusted and matched to the transmitter. Readjustment should only be attempted when changes in the reed bank indicate it. Generally speaking, once the reed bank has been used for a few hours, and then returned, it will set in. Their readjustment will not be necessary for long periods.

Despite very careful testing at the factory, it is possible that a small piece of dirt or other matter might become imbedded under one of the reed contacts. If one of the reeds appears to be driving well but does not actuate the associated servo, the reed may be cleaned as follows: cut a small length of 0.040 piano wire and file or grind it across the width of the wire to roughen it. Very carefully rub this roughened surface of the wire across the reed contact and reed. DO NOT in any way disturb or excessively bend the reed itself. After the reeds have been operated for a short period of time it is unlikely that they will ever require further cleaning or attention.

CHANGING FREQUENCY

Because of the carefully balanced circuitry of the transmitter, it must be returned to the factory for frequency change. It also should be noted, that any truly selective superheterodyne receiver should be matched to its transmitter for optimum performance.

A charge of \$10.00 will be made for changing this transmitter's frequency. A charge of \$12.50 will be made for changing the KRAFT superheterodyne receiver and transmitter combination. This charge includes exchanging crystals, complete realignment, and a thorough checkout of both units together.

Include your check or money order when returning units to the factory for frequency change. Pack very carefully to avoid shipping damage.

FCC LICENSE

IT IS ILLEGAL TO OPERATE THIS TRANSMITTER WITHOUT A CITIZENS BAND LICENSE. Form 505 for securing this license is available from your dealer or the nearest Federal Communications Commission Office.

GUARANTEE

The KRAFT Custom 4, 6, 10 or 12 All Transistor Transmitter is guaranteed against defects in workmanship and material for 90 days from the date of purchase. In case of trouble, return the unit to the factory. Enclose \$5.00 to cover the cost of return postage, insurance, and handling. Failure to include the handling charge will indefinitely delay the return of your unit. If the unit is judged to be defective, we will immediately repair or replace it and return it to you at no charge. If our inspection indicates that it has been tampered with or physically damaged, we will send you a repair estimate. NO C.O.D. SHIPMENTS WILL BE MADE.

CONCLUSION

We take great pride in our electronic design and workmanship and in the careful, thorough testing of every unit we manufacture. Our standard of manufacture is that we would personally use any unit which leaves our plant in our most prized model under any conditions.

If you have any comments or criticisms regarding our equipment, we would appreciate hearing from you.

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