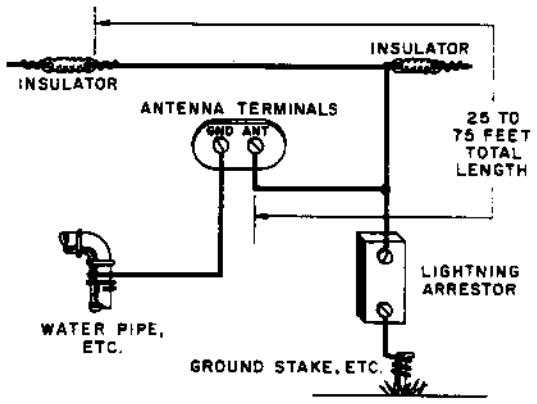
The National NC-190 receiver is designed to match an unbalanced 50 ohm antenna transmission line. Individual antenna coils are used on each band. Impedance match is obtained by use of small primary coupling windings on the antenna coils.

THE ANTENNA

The NC-190 incorporates two methods of antenna connection, a small coaxial jack for use when shielded types of lead-in are used, and a two terminal antenna strip suitably marked A (antenna) and G (ground) for use where individual lead wires are employed. The simplest antenna is a single long wire antenna illustrated in the figure below. When an antenna of this type is used, a suitable ground connection is recommended for best results. Generally speaking, an antenna between 15 feet and 40 feet long should provide ample signal pick-up for most of the bands in use. When the receiver is to be used predominantly on any one band, better results can be obtained with one of the many types of tuned antennas. The subject of antennas and the matching of antennas to receivers is in itself a major study. The owner of the NC-190 should consult many of the excellent references published by the American Radio Relay League and other organizations. In all cases where an external exposed antenna is employed, suitable consideration should be given to lightning protection for the sake of insuring safety to the operator and to the equipment.

The proper antenna coil is selected by means of the bandswitch which, switches the primary and secondary windings of the desired coil into the receiver circuit. On the broadcast band, the bandswitch connects the secondary of the antenna coil directly to the mixer grid bypassing the RF stage.



SINGLE WIRE ANTENNA

BANDSWITCH

The bandswitch of the NC-190 is labeled in megacycles. The switch is simply placed in the desired band position as indicated by the markings .54-1.6, 1.6-4.0, 4.0-10, 10-20 and 20-30. When the bandswitch has been set for the band desired, the corresponding general coverage dial scale is used to indicate the frequency of receiver tuning.

The secondary of the antenna coil is used as a tuned circuit to achieve selectivity in the antenna stage of the receiver. This coil is tuned by means of the main tuning capacitor, the bandspread capacitor and the antenna trimmer.

ANTENNA TRIMMER

The antenna trimmer control is used to make a final adjustment of the tuned circuit to insure maximum gain on the frequency region in use. Adjustment is necessary because the presence of various types of antennas will have some detuning effect on the antenna stage. The use of the antenna trimmer allows compensation of the receiver to match any type of antenna which may be connected to it. It is normally necessary to set the antenna trimmer only once for a frequency region in use. This is best accomplished by tuning the receiver away from any signal and adjusting the antenna trimmer for maximum background noise in the speaker or earphones.

The main tuning and bandspread capacitors determine the frequency to which the antenna, mixer and oscillator coils are tuned. The signal appearing across the antenna coil is coupled to the RF amplifier.

MAIN TUNING

The main tuning knob adjusts the setting of the main tuning capacitor. The pointer of the slide rule main tuning dial is coupled to the tuning capacitor to indicate frequency of operation. Proper frequency calibration of the main tuning dial depends on the setting of the bandspread dial. A triangular shaped set mark appears at the high frequency end of the bandspread scales in use. The bandspread dial should be set so that this triangular set mark appears directly under the bandspread index line. When set in this manner, the general coverage dial may be freely used to tune the receiver and the frequency of operation will be that determined by the dial scale corresponding to the setting of the bandswitch.

The bandspread capacitor is connected in parallel with the main tuning capacitor and acts as a vernier tuning control.

BANDSPREAD TUNING

The crowded frequency spectrum of the shortwave bands makes tuning of individual signals a difficult task unless some means of fine tuning (bandspread tuning) is provided. The bandspread knob of the NC-190 receiver provides this feature.