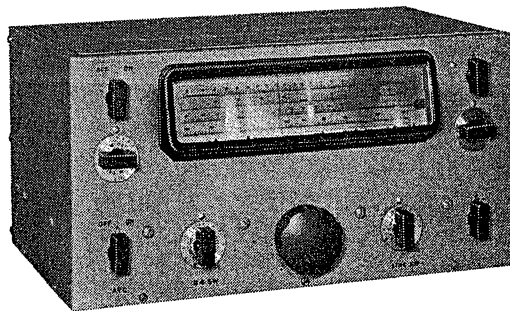


INSTRUCTION MANUAL  
for the  
**NATIONAL**  
**NC-80X and NC-81X**  
**RECEIVERS**



Tuning Range:  
30 Megacycles to 540 Kilocycles



THE presentation of the NC-80X and NC-81X receivers is in accordance with the firmly established policy of the National Company. Briefly, we believe that a new receiver should be much more than a rearrangement of parts in a redecorated cabinet; — we believe that a new model should be the result of definite engineering developments which will provide a higher order of performance. You will find a number of such developments described in the following pages, and each one contributes toward making the NC-80X and NC-81X receivers outstanding in the communications field.

*Copyright 1938*

# The NC-80X and NC-81X Receivers

## General Description

THE NC-80X is a ten tube superheterodyne covering frequencies from 540 to 30,000 kilocycles in four ranges. The NC-81X employs the same circuit but is fitted with a special tuning condenser and special coils to provide full band spread on the 10, 20, 40, 80 and 160 meter amateur bands; frequencies between these bands cannot be covered.

The circuit, as shown in the schematic diagram on page 9, consists of a first detector and oscillator employing separate tubes, three stages of I.F. amplification, a bias type power detector and a resistance coupled beam power output stage; maximum undistorted audio output is  $2\frac{1}{2}$  watts. A separate tube is employed to provide amplified and delayed AVC, and a separate beat frequency oscillator is coupled to the 2nd detector for c.w. reception. The power supply is of the 110-120 volt AC-DC type, except in models designed for 220-240 volt operation and certain other special services, such receivers being equipped with a suitable built-in power transformer.

Battery models are designed for 135 volt operation with a 6-volt heater supply. The receiver is fitted with a suitable cable and plug for making the connections. The B-supply drain is approximately 35 milliamperes, while the heater current is 2.8 amperes.

Fundamental design advances include an automatic plug-in coil system which combines all the desirable features of plug-in coils and coil switching, and a new high frequency I.F. channel having a crystal filter which provides continuously variable selectivity over a range of from 300 cycles to 7 kilocycles. The tuning system is of an entirely new design and employs a multiple-scale dial of the full-vision type, accurately calibrated in megacycles. Several unusual features are incorporated, such as the mirror, for overcoming parallax, the auxiliary linear scale, numbered from 0 to 100, and six adjustable frequency markers by means of which any particular stations or frequencies may be "logged" on the dial itself. A dual vernier reduction drive is used which provides a 55 to 1 reduction over any narrow band of frequencies with automatic shift to an 11 to 1 reduction for conveniently and rapidly moving the pointer to another section of the scale.

## Tubes

The NC-80X and NC-81X are supplied complete with tubes which are tested to the individual receiver at the time of alignment. The tubes should not be indiscriminately changed from one socket to another. The circuit arrangement is as follows:

1st Detector.....	6J7
High Frequency Oscillator.....	6J7
1st I.F.....	6K7
2nd I.F.....	6K7
3rd I.F.....	6K7
2nd Detector.....	6C5
AVC.....	6B8
Beat Frequency Oscillator.....	6J7
Power Output.....	25L6G
Rectifier.....	25Z5

The battery models have no rectifier tube and employ a Type 6V6G output tube instead of the 25L6G.

## Antenna

The input circuits of both the NC-80X and NC-81X receivers are arranged for operation with either the doublet or single-wire type of antenna. There are two input terminals on the righthand side of the cabinet, marked "Ant" and "Gnd." When using a single-wire antenna, the lead-in should be connected to the antenna post and the short flexible lead, which is connected to the chassis near the ground post, should be clamped under the "Gnd" terminal. An external ground connection may or may not be necessary, depending upon the installation. The ground is usually desirable when receiving wave-lengths above 100 meters, but for wave-lengths below 50 meters, the use of a ground may actually weaken signals. Doublet antenna feeders should be connected directly to the input terminals and the flexible ground connection, mentioned above, is not used at all. The input impedance of the receiver varies over the total frequency range but averages about 500 ohms.

Where local noise is not bothersome, the single-wire type of antenna is to be preferred. In some installations, however, where there are one or more sources of interference within fifty feet of the receiver, the single-wire will pick up the disturbance on the lead-in portion. Under such con-

# The NC-80X and NC-81X Receivers

## General Description

THE NC-80X is a ten tube superheterodyne covering frequencies from 540 to 30,000 kilocycles in four ranges. The NC-81X employs the same circuit but is fitted with a special tuning condenser and special coils to provide full band spread on the 10, 20, 40, 80 and 160 meter amateur bands; frequencies between these bands cannot be covered.

The circuit, as shown in the schematic diagram on page 9, consists of a first detector and oscillator employing separate tubes, three stages of I.F. amplification, a bias type power detector and a resistance coupled beam power output stage; maximum undistorted audio output is  $2\frac{1}{2}$  watts. A separate tube is employed to provide amplified and delayed AVC, and a separate beat frequency oscillator is coupled to the 2nd detector for c.w. reception. The power supply is of the 110-120 volt AC-DC type, except in models designed for 220-240 volt operation and certain other special services, such receivers being equipped with a suitable built-in power transformer.

Battery models are designed for 135 volt operation with a 6-volt heater supply. The receiver is fitted with a suitable cable and plug for making the connections. The B-supply drain is approximately 35 milliamperes, while the heater current is 2.8 amperes.

Fundamental design advances include an automatic plug-in coil system which combines all the desirable features of plug-in coils and coil switching, and a new high frequency I.F. channel having a crystal filter which provides continuously variable selectivity over a range of from 300 cycles to 7 kilocycles. The tuning system is of an entirely new design and employs a multiple-scale dial of the full-vision type, accurately calibrated in megacycles. Several unusual features are incorporated, such as the mirror, for overcoming parallax, the auxiliary linear scale, numbered from 0 to 100, and six adjustable frequency markers by means of which any particular stations or frequencies may be "logged" on the dial itself. A dual vernier reduction drive is used which provides a 55 to 1 reduction over any narrow band of frequencies with automatic shift to an 11 to 1 reduction for conveniently and rapidly moving the pointer to another section of the scale.

## Tubes

The NC-80X and NC-81X are supplied complete with tubes which are tested to the individual receiver at the time of alignment. The tubes should not be indiscriminately changed from one socket to another. The circuit arrangement is as follows:

1st Detector.....	6J7
High Frequency Oscillator.....	6J7
1st I.F.....	6K7
2nd I.F.....	6K7
3rd I.F.....	6K7
2nd Detector.....	6C5
AVC.....	6B8
Beat Frequency Oscillator.....	6J7
Power Output.....	25L6G
Rectifier.....	25Z5

The battery models have no rectifier tube and employ a Type 6V6G output tube instead of the 25L6G.

## Antenna

The input circuits of both the NC-80X and NC-81X receivers are arranged for operation with either the doublet or single-wire type of antenna. There are two input terminals on the righthand side of the cabinet, marked "Ant" and "Gnd." When using a single-wire antenna, the lead-in should be connected to the antenna post and the short flexible lead, which is connected to the chassis near the ground post, should be clamped under the "Gnd" terminal. An external ground connection may or may not be necessary, depending upon the installation. The ground is usually desirable when receiving wave-lengths above 100 meters, but for wave-lengths below 50 meters, the use of a ground may actually weaken signals. Doublet antenna feeders should be connected directly to the input terminals and the flexible ground connection, mentioned above, is not used at all. The input impedance of the receiver varies over the total frequency range but averages about 500 ohms.

Where local noise is not bothersome, the single-wire type of antenna is to be preferred. In some installations, however, where there are one or more sources of interference within fifty feet of the receiver, the single-wire will pick up the disturbance on the lead-in portion. Under such con-