

NATIONAL NC-77X RECEIVER

The NC-77X receiver is from circa 1963-1967 and was manufactured by the National Radio Company in Malden, MA, USA.

Specifications

Single conversion super-heterodyne; 455 Khz IF

Four bands – 540 Khz through 31 Mhz

Modified All American Five – AA5 design featuring a line isolation power transformer

117 VAC – 30 Watts

Controls:

Bandsread – slide rule dial 0-100,

Bandswitch, four position 540-1600 Khz, 1.6-4.5 Mhz, 4.0-12 Mhz, 10-31 Mhz

Volume with On-Off,

Tuning – slide rule dial corresponding to selected band

Switches:

Slide switch to activate BFO

Slide switch to place the receiver into Standby

Headphone Jack:

Front Panel ¼ inch jack: Headphones

Built-in speaker

Tubes

12BE6 – converter

12BA6 – IF amplifier

12AV6 – detector first audio

50C5 – audio output

35W4 – rectifier

The NC-77X is a basic all band shortwave receiver of All American Five design but importantly it includes an AC line isolation power transformer for added safety. The receiver features exceptionally high quality construction and components

ALIGNMENT INSTRUCTIONS

The NC-77X Receiver has been carefully aligned at the factory by specially trained and experienced personnel using precision equipment. Alignment of the receiver should not be attempted until all other possible causes of faulty operation have been investigated. Alignment should be made only by persons familiar with communications receivers and experienced in their alignment.

EQUIPMENT REQUIRED

1. Signal generator covering 455 Kc to 35 Mc.
2. Vacuum tube voltmeter (VTVM).
3. Output meter. The AC scale of the VTVM can be used.
4. Tuning Wand — General Cement No. 8278 or equivalent.
5. Hex alignment tool — General Cement No. 5097 or equivalent.

455 KC IF ALIGNMENT

Signal Generator Connections	Signal Generator Frequency	BAND switch Setting	Output Connections	Remarks
High side directly to mixer section of tuning gang. Low side to chassis.	455 Kc (unmod.)	B-CAST	VTVM DC probe to top of VOLUME control. Low side to chassis.	Adjust top and bottom of T-1 and T-2 for maximum indication. Maintain approximately 2 V. reading on VTVM.

RF ALIGNMENT

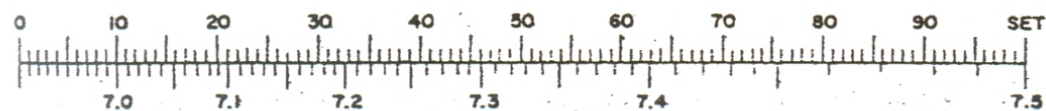
GENERAL INSTRUCTIONS. Before proceeding with RF alignment, check dial pointer for proper indexing. With tuning gang fully closed, set the pointer so that it reads exactly 10.5 on 11-30 MC Band. With bandsread capacitor fully closed, adjust pointer to 0 at the left end of the calibrated scale. Then open bandsread capacitor to "Set" mark.

Connect high side of generator to antenna (A) terminal through a 68 Ω , 1/2W resistor. Connect low side to ground (G) terminal. The oscillator circuits should always be adjusted first for proper dial calibration at the specified frequencies on each band. Then the mixer circuits should be set for maximum output. A certain amount of interaction may occur between oscillator and RF adjustments. Final adjustment should be made for correct calibration. The trimmer adjustments should always be the final adjustment for each band. The oscillator frequency is on the high side of the signal frequency on the lowest three bands and below signal frequency on the 11-30 MC band. Suitable precautions or checks should be used to insure these conditions.

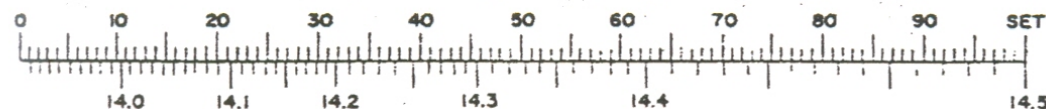
Bandswitch Setting	Generator and Receiver Frequency	Adjustments
1	1.5 MC	C ₅ for correct calibration C ₁ for maximum output
2	4.0 MC	C ₈ for correct calibration C ₂ for maximum output
3	11.0 MC	C ₇ for correct calibration C ₃ for maximum output
3	4.5 MC	L ₇ for correct calibration
4	28.0 MC	C ₈ for correct calibration C ₄ for maximum output
4	11.0 MC	L ₃ for correct calibration L ₄ for maximum output



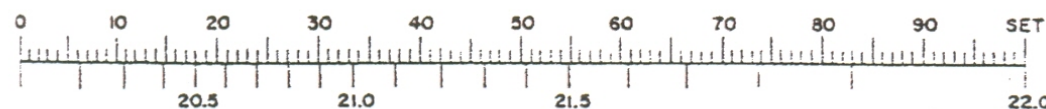
80 METER AMATEUR
BANDSWITCH: 2
MAIN TUNING: 4.0 MC



40 METER AMATEUR
41 METER FOREIGN
BANDSWITCH: 3
MAIN TUNING: 7.5 MC



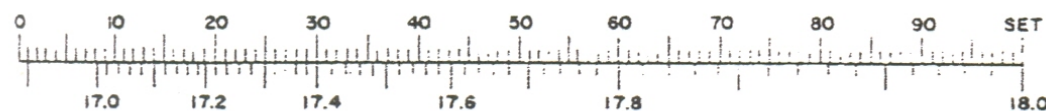
20 METER AMATEUR
BANDSWITCH: 4
MAIN TUNING: 14.5 MC



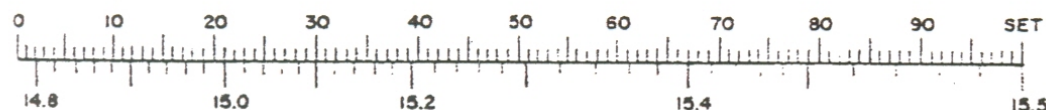
15 METER AMATEUR
13 METER FOREIGN
BANDSWITCH: 4
MAIN TUNING: 22 MC



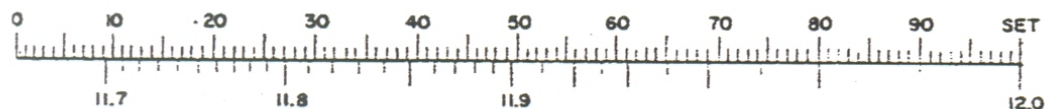
10 METER AMATEUR
CITIZENS BAND
BANDSWITCH: 4
MAIN TUNING: 30 MC



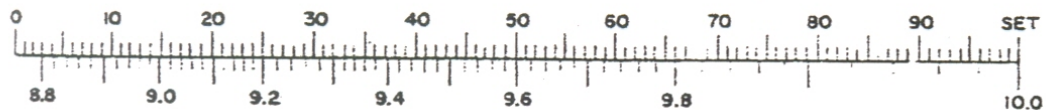
16 METER FOREIGN
BANDSWITCH: 4
MAIN TUNING: 18.0 MC



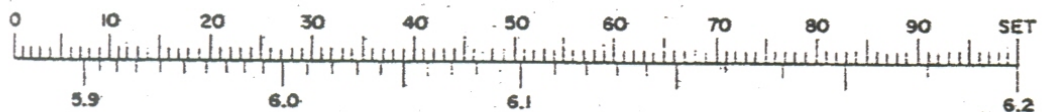
19 METER FOREIGN
BANDSWITCH: 4
MAIN TUNING: 15.5 MC



25 METER FOREIGN
BANDSWITCH: 3
MAIN TUNING: 12 MC



31 METER FOREIGN
BANDSWITCH: 3
MAIN TUNING: 10 MC



49 METER FOREIGN
BANDSWITCH: 3
MAIN TUNING: 6.2 MC

Dial Scale Calibration Chart

BANDSPREAD TUNING

The crowded frequency spectrum of the shortwave bands makes tuning individual signals a difficult task unless some means of fine tuning (bandspread tuning) is provided. The BANDSPREAD knob of the NC-77X Receiver provides this feature.

As the BANDSPREAD control is tuned from the Set mark, the frequency to which the receiver is tuned will be reduced, just as though the MAIN TUNING control was tuned to a lower frequency. Rotation of the BANDSPREAD control will make this frequency change at a much slower rate than can be accomplished through use of the MAIN TUNING control, thus making it possible to tune the crowded shortwave bands with ease. If it is desired to use the Bandspread dial for fine tuning the main tuning dial should be set just above the region of interest. The Bandspread dial will now function as a fine tuning control in this frequency region.

Approximate CALIBRATION SCALES ARE INCLUDED ON THE OPPOSITE PAGE. These scales are actual size and include the popular 80-, 40-, 20-, 15- and 10-meter amateur bands, the 49-, 41-, 31-, 25-, 19-, 16- and 13-meter foreign bands, and the citizens band. Proper indication of the Bandspread scale for these calibrations requires that the Main Tuning pointer be set at an exact frequency. Each calibrated scale has a note indicating the proper BAND switch and Main Tuning pointer setting. The Main Tuning pointer should be placed at this setting. All further tuning may then be done with the BANDSPREAD control; the frequency of the receiver will then be indicated on the appropriate bandspread scale. For extreme accuracy it is recommended that the Bandspread pointer be set to a known signal frequency or a calibrating signal frequency. Then adjust the MAIN TUNING to receive this signal. The BANDSPREAD scales are now properly calibrated provided the MAIN TUNING is not moved from this setting.

The high frequency oscillator is a grounded plate Hartley oscillator using the cathode, grid and screen of the high frequency mixer. Sections of the main and bandspread tuning capacitors tune the oscillator with the BAND switch again selecting the coil for the band in use. The high

frequency oscillator operates 455 kilocycles above the signal on the three lowest frequency bands and operates 455 kilocycles below the signal on the highest frequency band. The signal appearing at the plate of the mixer is coupled through a double-tuned 455 kc. IF transformer to the grid of the first IF stage. The amplified signal at the plate of the IF stage is fed to the double-tuned IF output transformer and in turn to the diodes of the 12AV6 tube which functions as a conventional diode detector. The detector output appears across the VOLUME control.

VOLUME

Turn VOLUME control clockwise to apply power to the receiver. Volume may then be adjusted with this control for a comfortable listening level.

The signal from the VOLUME control is coupled to the triode section of the 12AV6 tube which functions as an audio amplifier and feeds the 50C5 audio output stage.

HEADPHONE-SPEAKER SELECTION

Under normal operating conditions, the built-in PM loudspeaker in your NC-77X is used. If headphone reception is desired, a phone-jack, which will accept any standard two-pole phone plug, is provided in the center of the control panel. When the phone plug is inserted in this jack the built-in loudspeaker is automatically disconnected. The impedance of the headphone circuit is not critical, and use of various types of headphones including crystal types is allowed.

CW OPERATION

CW, or code telegraphy operation, is performed in exactly the same manner as AM operation except that the OFF-CW switch is placed in its CW position. This setting activates a beat-frequency oscillator which produces an audible tone when keyed by the incoming signal.

The NC-77X incorporates an AC type Power Supply. The secondary of the power transformer feeds the 35W4 halfwave rectifier and its associated filter. The secondary of the power transformer also provides power for the vacuum tube heaters.

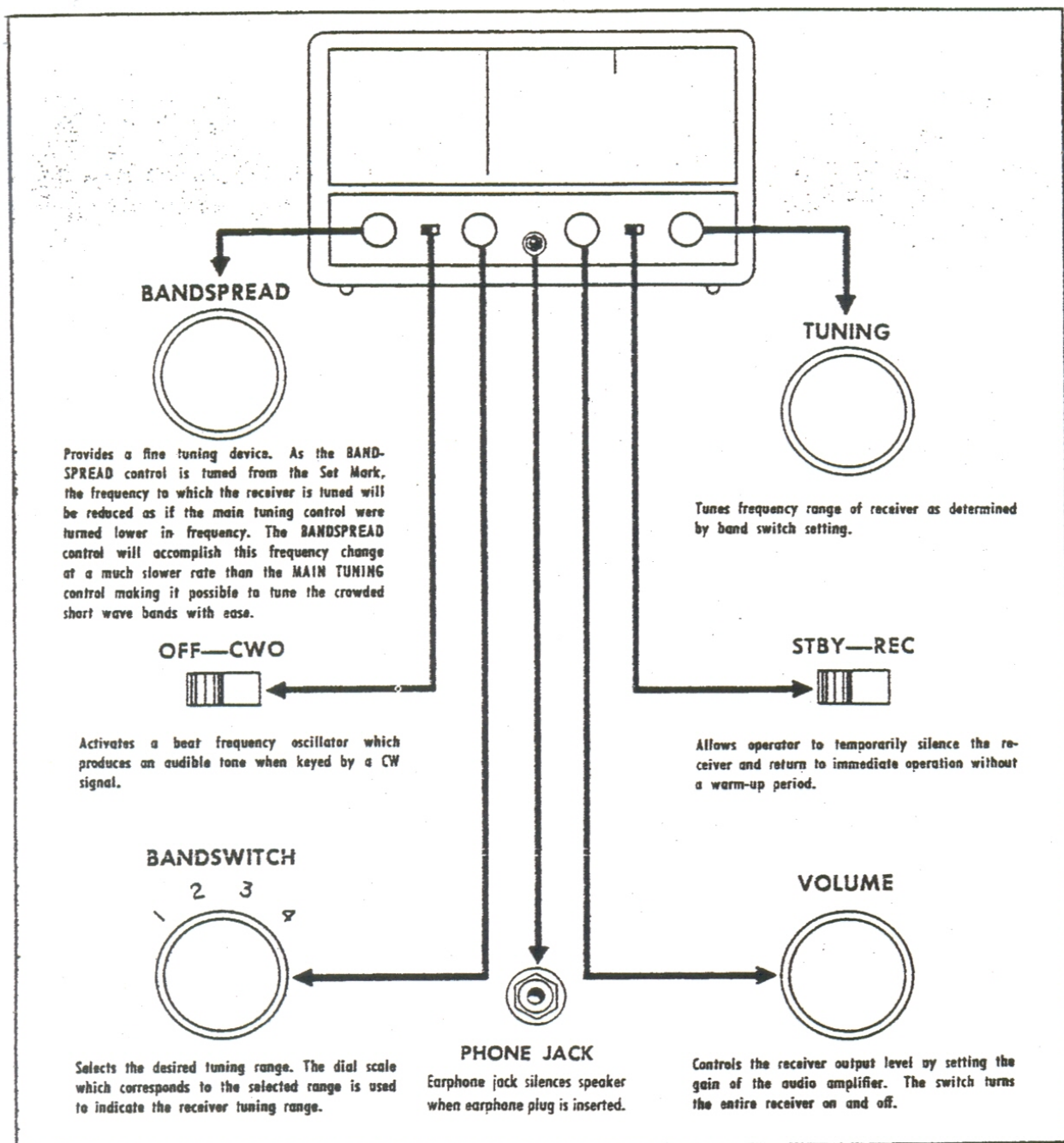


Figure 3-1. NC-77X Controls and Switches

12BE6

12BA6

12AV6

50C5

