

THE COMMUNICATION RECEIVER

EDITED BY

WILLIAM FIZETTE, K3ZJW
RD #1 Box 55, Henryville, PA 18332

All correspondence requires SASE for reply



RESTORING THE NATIONAL NC-46

Edward M. Gable, K2MP

737 Latta Rd., Rochester, NY 14612

Almost lost in the flood of new and surplus equipment in the years immediately following WW II was a little known entry by the National Company of Malden, Mass., the NC-46. First announced in November, 1945, it was billed as an updated NC-45, the last of the prewar series of National AC-DC communications and general-coverage receivers, beginning with the NC-80 and 81 in 1937.

The NC-46, with matching speaker, sold for an economical \$107.40 in mid-1946. However, the popular image of AC-DC sets being "cheap," coupled with the general-coverage design and the lack of a preselector stage, apparently resulted in a low volume of sales, and the model was eclipsed by other, more dramatic, receivers. K2MP was fortunate enough to acquire a NC-46, and discusses some aspects of his restoration, which, incidentally, are largely applicable to other radios.

ELECTRICAL RESTORATION

This AC-DC set operates from a B+ supply of just under 120 VDC. As a result, the latitude of bias voltages and other operating points is quite critical. With the larger voltage swings available on transformer sets with high B+ voltages you can get away with a little more leakage in some capacitors and a greater variance in resistor values, yet still have acceptable performance. However, with this radio, ALL values appear to be critical.

The usual paper-capacitor problems will be found and they should be replaced. Further, National used early carbon-composition resistors with the characteristic problem of ab-

sorbing moisture, greatly affecting their value and stability. This is especially true with the higher values, 100K and greater. The one-half, one, and two megohm values used in the AVC and audio bias circuits are very suspect. They should be checked and replaced as necessary.

The original C-7 115-volt lamp is hard to find. A suitable replacement, although shorter, is a clear 4-watt night-light type bulb.

As with any AC-DC radio, the use of an isolation transformer on your workbench is highly advised. This not only protects you, but can save your grounded test instruments from damage as well. Caution should also be observed on the rear of the set where B+ voltage appears on the terminal strip below the speaker connections.

MECHANICAL RESTORATION

My particular receiver was in terrible condition and badly needed new paint. If you have this problem, the only way to do it correctly is to bite the bullet and take the cabinet apart. You will end up with a front panel, a front bezel, left and right sides, a rear panel, a top cover, and lots of hardware. To make it easier, save the hardware in separate envelopes, each marked for the section being removed.

Pay close attention to the insulating shoulder washers used to insulate the cabinet from the AC-line hot chassis. You will need to get ALL of

these back into the correct locations to maintain this important safety feature.

Since the rear terminal strips are permanently mounted to the panel, you will have to unsolder the speaker, B+, antenna and AC power leads before removing it. The silk-screened front



panel is finished with a smooth paint and, in my case, responded well to a mild automotive cleaner-wax.

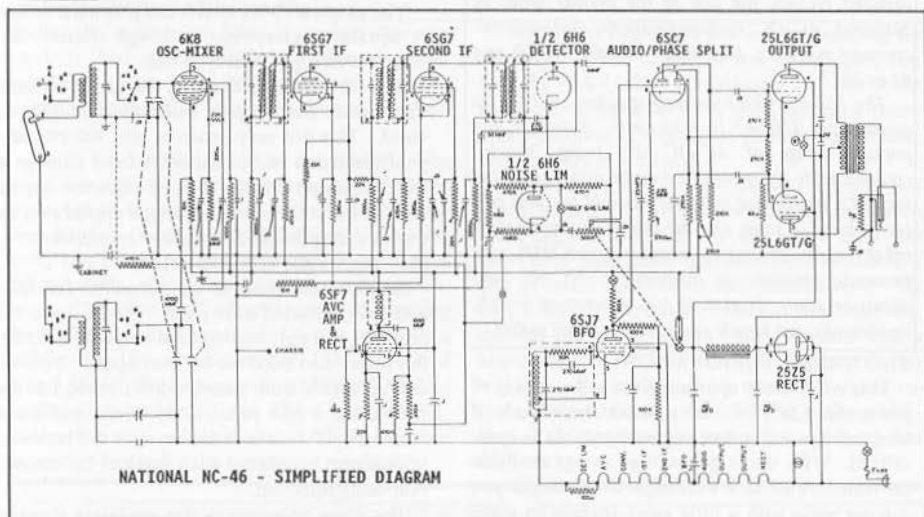
The set I have worked when first obtained only with the bandspread control at the "SET" position. The reason became obvious when I discovered the crushed plates of the bandspread capacitor. I suppose we have all been guilty, when moving a set with a hinged top cover, of opening the cover and tossing the AC-line cord inside. We get away with it most of the time, but someday the plug or cord is going to fall into one of the tuning capacitors. One good "twiddle" of the knob and it's surgery time. A word to the wise: don't do that!

The NC-46 uses a very nice friction drive combined with dial cords to operate the pointers. A good grade of oil should be placed on the numerous shaft bearings. Do be careful, however, not

to get oil on the friction surfaces of the drives. A very satisfactory and easily obtained oil is available from Radio Shack under the Archer name. It comes in a tube complete with a needle applicator for hard-to-reach spots.

For those without a manual (like me), the NC-46 is covered in good detail in Sams Photofact Folder #9 (original No. 469), page 26. The writeup in Rider's Vol. XV (pp. 15-25 to 15-28) is unusually complete for Rider documentation, constituting essentially a user instruction manual. Other information can be found in National ads in QST during 1946.

The end product is very pleasing. The two-tone gray paint contrasting with the white dial is quite unusual, as is the overall appearance of the set, making this National Company AC-DC receiver a nice addition to anyone's collection. Even a "dyed-in-the-wool" RME guy!



The broadcast-to-30-MHz NC-46 offers a number of attractive features. The use of a separate oscillator (the triode part of the 6K8) implies freedom from annoying "birdies" that warble up and down in frequency as the signal fades, as happens in the Hallicrafters S-38. National used a straight-line-frequency tuning capacitor, a nice feature that results in relatively linear dial scales. The dual IFs with relatively "hot" tubes (6SG7s, with about twice the transconductance of 6SK7s) and iron-core transformers implies ample gain; National claimed 4.5-kHz selectivity, which is respectable for a receiver of this class and vintage. Amplified AVC and a noise limiter are quality features. The push-pull audio output (claimed power: three watts) is a way to overcome the problem of low B+ voltage, but also

implies low distortion. With the good-sized external speaker, broadcast reception must be rather pleasant. The underchassis layout is tidy, with laced cabling. However, the lack of an RF stage is unfortunate; National's ads admitted the image rejection isn't much, and the noise performance of simple pentode mixers on ten meters is never great. The available bandspread on the amateur bands is quite wide, but uncalibrated.

The NC-46 shown in the catalog section of the 1946 ARRL Handbook is widely different from the production version. The illustration shows a plain box cabinet: no stepped ends. The switches and controls are placed in two vertical rows, widely separated. Presumably a prototype that received some restyling before actual manufacture. Now, *there's* a collectible!