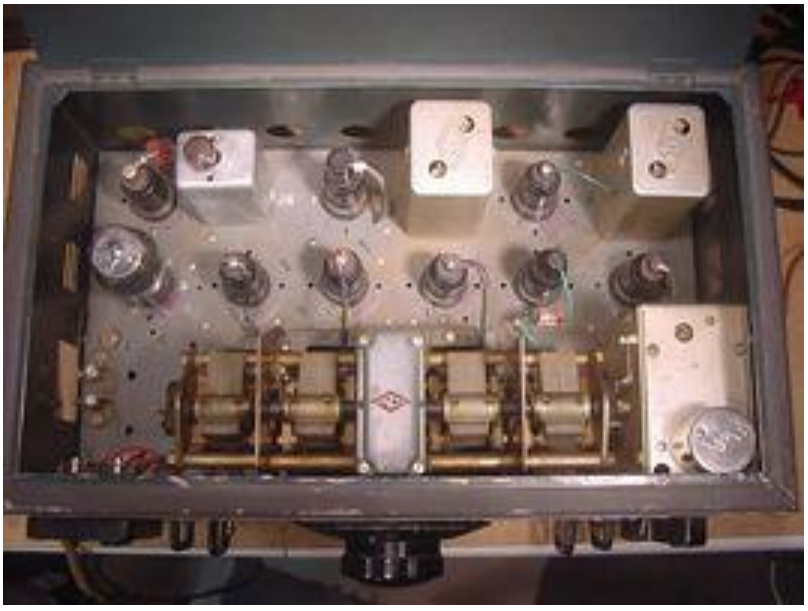
Restoring a Pre-WWII National HRO Receiver – Gerry O'Hara

The HRO is a classic communications receiver built by the National company in the USA in several variants from the mid 1930's through after WWII. The set is notable for its clever design which uses a series of plug-in coil units - one for each waveband, many including a bandspread facility for the amateur bands. The plug-in coil packs avoid the complex band-switching arrangements necessary in multiple waveband sets, and the coils are located beneath the chassis, where the temperature is more constant, leading to increased stability. The tuning mechanism is built like a tank and the famous 'PW' tuning dial is a marvel of engineering. Frequency is read out from a scale on the dial marked 0 to 500, and this vernier reading converted to frequency using a chart supplied with each coil pack. This system facilitated re-setting the set to the same frequency but was of less uses for 'bandcruising' use.



The SPARC museum owns several of these sets in various states of repair. This particular example was in a bit of a state on arrival, having been at the receiving end of a large soldering iron and someone's enthusiastic but clumsy rebuild some time in the distant past... probably in the late-1940's or early-1950's, as the original glass tubes had been replaced by metal-envelope tubes – a popular 'modernization' approach in the immediate post-war years.

After filling in the many unwanted non-standard holes in the front panel and chassis with JB-Weld, the front panel and case were re-finished in black wrinkle paint using an aerosol spray. Although not perfect, the re-finished cabinet is significantly better than when received, although we may have it powder coated at some point in the future. The outer dial was stripped to the bare metal as found on the early series HRO's (the original black finish was in very poor condition). A 'mongrel' S-meter was removed and replaced with an

authentic one (thanks to Ralph Parker), which works well and looks the part. A blue-white LED light was installed into the meter that adds a nice effect and does not bake the innards of the meter like a standard light bulb would. A mongrel BFO coil/can installed in the set on arrival was replaced with a real National item (thanks again Ralph) and the correct type of National knob fitted to the variable selectivity control (it previously had a mongrel knob fitted). The BFO switch in HRO's is fitted to the BFO tuning capacitor shaft, but in this set the actuating bar and switch were missing (a switch had been fitted to the front panel instead) - having removed the panel switch, a microswitch was fitted to the BFO capacitor frame, actuated by a plastic tie wrapped around the capacitor shaft - this arrangement works very well.

The wiring was checked against the schematic: the change to metal octal tubes sometime in the past involved almost a complete re-wire of the chassis by someone and on close inspection it was not a pretty site – 7 dry joints were identified (dirty component wire that had not soldered), along with one solder 'bridge' and three wiring mistakes – it was a wonder it ever worked like that. Many capacitors had already been replaced - most bypass capacitors with 0.05uF ceramic, and although these should be 0.1uf, these all tested ok and they were therefore left in place. However, quite a few other capacitors were replaced (all paper and electrolytics) and also a few resistors - including the audio gain pot, either because they tested poor/marginal or they just looked bad. The chassis was not completely re-wired, but the existing wiring was all carefully checked and almost every joint was cleaned and re-soldered.

When switched on, the set worked ok right off the bat (apart from the RF gain working backwards – an easy fix). The three coil packs it

came with were all tested in the set and it pulled in some local amateurs on 40m SSB on a few feet of wire plus lots of stations on several SW broadcast bands. Re-alignment was straightforward and the set now has great sensitivity and selectivity (the crystal filter is particularly good) – it is also very stable.

It was decided not to mount the output transformer on the chassis or in the speaker, but instead it was placed it in a small plastic box that has two lugs mounted on it (connected to the transformer primary) and attached to the screw terminals on the rear of the receiver. The box is fitted with screw terminals and a jack for speaker or low-impedance headphones - works great, and a double-bonus that there were no mods to the set and no high voltages on the speaker wires. Finally, a couple of labels were added to the front of the set – in part to distract the eye from where the wrinkling did not work too well on the new paint finish – plus some on the rear warning of high voltage on the rear terminals for safety reasons.

Of course this HRO 'Senior' will never be 'original'. It dates from mid-1940 and, as such, and should be fitted with 6C6/6D6 tubes, have a round S-meter and a black dial, but hey, you can still have lots of fun with it!