



Ben Nock's

valve & vintage

This month Ben Nock G4BXD looks at a well known Eddystone receiver, and starts restoring an HRO NC-100.

Once again it's my turn at opening up the *Valve & Vintage (V&V)* shop and it's very nice to be here as usual. We should be well into summer now though at the time of writing this there hasn't been much sun to speak of! Hopefully I can get to a few rallies this year and locate new examples for the 'Kidderminster Kollection' but not to worry, I've still found some new items for this edition.

Eddystone Magic

A recent arrival at the Kollection was another example of Eddystone's very popular receiver of the late 1940s and early 1950s, the S640 general coverage set. This receiver tunes 1.7 to 31MHz in three bands and it employs nine octal-based valves with a superhet design. It features a 1.6MHz intermediate frequency (i.f.) and interestingly provides a good band-spread facility for the Amateur bands.

There were something like 4000 of the 640 receivers produced by Eddystone between 1947 and 1949 at an initial cost of a staggering £42. This included the then equivalent of VAT called Purchase Tax. However, in 1948 the receiver, and all receivers with a beat frequency oscillator (b.f.o.), became tax exempt and the price of the receiver fell to a mere £27 and 10 Shillings. Incidentally, a quick search on the web for a price comparison gave £42 in 1948 as equal to just over £1000 in today's money!

As with many of the sets on sale today the 'optional' extra was also available at a price and included the famous round loudspeaker and the small plug-in S-meter unit. Both these items are much sought after by collectors today to finish off the appearance of these sets.

On arrival the set, **Fig. 1**, was placed on the bench and I connected it to the mains via a variable transformer, the voltage being increased slowly while the high tension (h.t.) was monitored on a test meter and a watchful eye kept on things. All seemed quite well as noise was coming from the

loudspeaker, although several controls were quite noisy, in that they crackled when operated (obviously the set had not been used for some time).

I connecting a short length of wire as an antenna and while tuning around signals across the three bands were heard – but the operation of the radio frequency (r.f.) gain control produced some very weird effects. It was as if the set was a regeneration type receiver, advancing the r.f. gain increased the gain and the set then

suddenly burst into self-oscillation with whistles and squeals. Faults of this nature are usually indicative of de-coupling problems, faulty capacitors or earth connections.

I then proceeded to waste two days chasing the fault, which was as it turned out, was non-existent capacitor problem! So, I changed all the de-couplers around the i.f. stages, checked the earth connection and the screened cables with no solution. I then noticed that as I placed a finger



Fig. 1: The S640 in its distinctive Eddystone styling.



Fig. 2: The foil wrapped i.f. valves, now quietly doing their jobs!

near to the grid top cap of the 2nd i.f. amplifier valve, a strange change in the self-oscillating frequency occurred.

Further investigation led me to the conclusion it was not a capacitor fault directly but one of stray capacitance. The valves used in the i.f. stages are EF39 types, these have a red outer coating on the glass, which is in fact an earth screen. Wrapping the two valves in tin foil, **Fig. 2**, and securely grounding it to earth stopped the self-oscillation completely, the r.f. gain control works as it should and peace has been restored. New, old stock (NOS) valves would have had the same effect but I didn't have any in my stores.

I then gave the receiver a quick tweak on the alignment of the r.f. and mixer tuned circuits and it's performing quite well now. The dial plate, though, has the odd effect of what looks like a varnish covering actually lifting and peeling away. The lettering looks to be okay, so once I find out how to get the front off I can clean it up. Another nice example for the 'Kollection'.

National Radio

Another recent purchase for the Kollection was a National receiver, a company better known for producing the HRO receiver that many readers will be familiar with. This set, the NC-100 was produced from 1936 onwards and has many similarities with the



Fig. 3: The NC-100 receiver, with the very familiar tuning knob.

HRO with the exception of the band change. As most readers will know the HRO uses plug-in coil packs. The NC-100 actually carries all the coils it needs internally but its band switching is quite different to normal.

The receiver, **Fig. 3**, uses 12 valves in a single conversion superheterodyne design. The NC-100 is a general coverage receiver covering from 540kHz to 30MHz in five bands. There was another model, the NC-101X, which only covered the Amateur bands.

One stage of r.f. amplification and two stages of i.f. amplification

are used with low-loss insulation and high-Q coils. These were said to give the set ample sensitivity and selectivity while a 6E5 tuning indicator valve, with provision for signal strength measurement and provides an added convenience.

The NC-100 tuning ranges are in fact: 0.54 - 1.3MHz, 1.3 - 2.8MHz, 2.7 - 6.4MHz, 5.9 - 14.4MHz and 13.5 - 30MHz. While the NC-100 was available with or without a crystal filter the NC-101X was built and designed strictly for the Amateur bands and covered the 1.8, 3.5, 7.0, 14.0 and 28MHz amateur bands and had the crystal filter fitted as standard.

The method of band switching on this receiver uses a tray of coils, **Fig. 4**, which is mounted on a rail and moved using a rack and pinion gear system. The coils are in effect plug-in and as the tray is moved the coil pins engage in sockets fixed to the set's chassis. The tray holds five sets of three coils, for the r.f., mixer and oscillator circuits and the knob has a positive 'locked' feeling when they are correctly engaged. Additionally, the screen voltage to the receiver's r.f. and i.f. valves is also connected when the tray is in the correct position by an extra set of contacts.

When I received the set it was apparent that quite a few modifications had already been done to the set, see **Fig. 5**. The i.f. transformers (i.f.t.s) had been changed, from the nicely canned NC stamped ones to some rather inferior Maxi-Q types. The audio driver



Fig. 4: The NC-100's unusual coil switching arrangement.

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Fig. 5: The internal view of the NC-100 as the set arrived on Ben's bench.

transformer had been replaced and an electrical examination revealed the mains transformer was dead as were all the on/off toggle switches used in the set. Obviously it was going to be a demanding restoration project!

At the time of writing this column I've managed to complete quite a lot of work on the set. I purchased a new set of valves for the receiver, amazingly, even in these dire economic times, I was able to buy the valves from the USA, and pay postage, more cheaply than I could find them in the UK! I have changed all the old capacitors as a matter of course and after a couple of web-based collector group postings, I managed to purchase a set of i.f. transformers and the crystal filter unit from an HRO someone was breaking up.

From photographs in the NC-100 manual its i.f.t.s appeared to be the same as used in the HRO. These I have fitted, Fig. 6, and the set is working very well. There was a slight problem with the crystal filter unit though. In the HRO the actual crystal sits on top of the filter box. In the NC-100 there's not enough headroom and the photo in the manual shows the crystal mounted on the side of the box. So, I had to drill and mount a holder to the side wall and after a

little persuasion the crystal is now in place.

The audio side of the set is a 6C5 detector, which drives a pair of 6F6 valves in push-pull via a coupling transformer. This transformer had already been changed previously and tests to it made me feel it was also faulty. As finding a suitable

replacement was unlikely, I decided to replace one of the 6F6 output valves with another 6C5 wired as an audio pre-amplifier and simply use the remaining 6F6 as a single ended output stage. This proved an excellent solution and the audio output and the gain is more than adequate.

I have still to find a replacement mains transformer, find out why the automatic gain control (a.g.c.) is not functioning and change a further two special on/off toggle switches. I then need to give the set a full alignment and touch-up the paint job but all in all I am very pleased with the results. So far, it should prove to be a worthwhile job.

And Finally

Well that's about it for my latest stint at the V&V shop. I hope you've enjoyed the selection I have bought you and there are more pictures at www.qsl.net/g4bxd

As always I can be contacted at my E-mail address military1944@aol.com Cheerio for now!



Fig. 6: Part way through internal restoration, although Ben thinks there's still much more to be done!