Restoration of an Eddystone S.680/2, Part 2, by Gerry O'Hara, G8GUH/VE7GUH

Background

In Part 1 of this article prepared in July 2010, I gave a brief overview of the S.680/2 and comparisons with the S.680X (see also my restoration article on a S.680X, April, 2007), and covered preliminary inspection and safety checks, clean-up and power on, various repairs, transplants and substitutions, cosmetic restoration work and pre-alignment

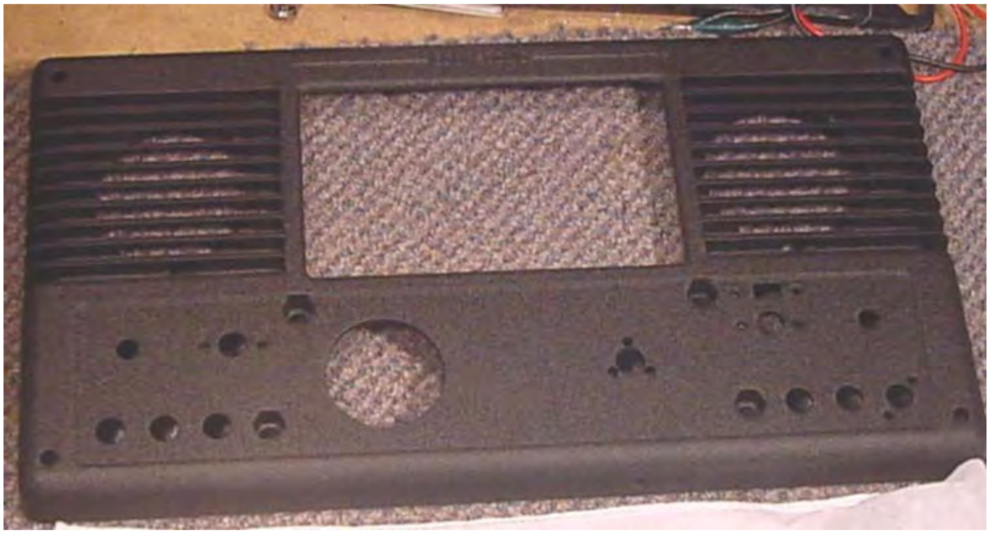
checks. The restoration work reached a hiatus back in July as the case and front panel casting were in need of more than a cursory touch-up. This concluding part of the article covers re-finishing of the case and front panel, detailed instructions on re-assembling the front panel, re-fitting the front panel to the receiver chassis, re-alignment, including selectivity

Above: detail of the fingerplate lettering (white Letraset on black paint) and mongrel small knobs fitted to the S.680/2 on arrival at my shack – functional? er, yes, authentic-looking? er, not exactly…

checks and adjustments using a wobbulator, and comments on the on-air performance of the restored receiver. Of course, it also includes a number of glamour photos of the set – a former 'bit of an ugly duckling' (photos on previous page) – and now not a bad-looker at all for over 61 years young!

Case History

The finish on the front panel and case of the set was looking rather tired and worse for wear – not too surprising in 60 years or so. Someone had tried repainting the front panel at some time (with black wrinkle-finish paint) but it had not worked well due to poor preparation. It did not take me long to decide that the only sensible thing to do was a complete strip-down to bare metal and re-finish in black wrinkle powder coat – a very hard, durable finish that looks the same as the original enamel finish that the Bath Tub applied. A fellow Eddystone enthusiast, Pat, has access to a bead-blasting cabinet and knows a local auto paint shop that applies this type of finish - mainly to vintage auto parts - but that will also take in the odd Eddystone radio case from time to time (at very reasonable cost). So, off it went (front panel casting and case) - the only downside is that items are processed in batches at the powder-coaters, so it can take some time



- around two months in this case (pardon the pun) - but who cares? All good things are worth the wait...
All I can say is that the wait was worth every second the case and front panel were away from my shack – they now look like new (just like the S.750 case I had done previously, the S-Meter and speaker that Pat had re-finished last year, and the S.640 that was powder coated at the same time for another local Eddystone radio enthusiast, Brian). I could hardly wait to re-assemble the set, it having spent the summer months up-ended on the floor of my shack with all its controls hanging out and looking rather sad and forlorn. I knew the re-finished case would soon cheer it up.

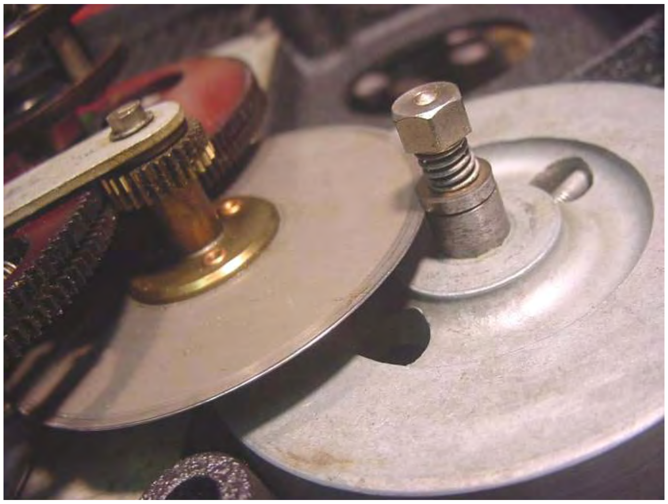
Re-assembly

The first job was to re-attach the tuning drive assembly (comprising gearbox, tuning dial, S-meter, friction drive and tuning shaft bush) to the front panel. To do this:

- Place the front panel flat, facing downwards on the workbench (I always use a piece of carpet on the bench to protect radios I am working on);
- Clean the dial glass and place into the aperture on the front panel;
- Place the two spring-steel strips that flank the dial into their positions either side of the dial glass, making sure they are turned the correct way around;
- Place the scale plate/gearbox assembly in position and slide the two steel separator strips between the scale plate and the gearbox front plate, making sure they are orientated correctly to allow the four 4BA screws to be inserted through

the gearbox front plate, separator strips, scale plate and then tightened into the front panel;

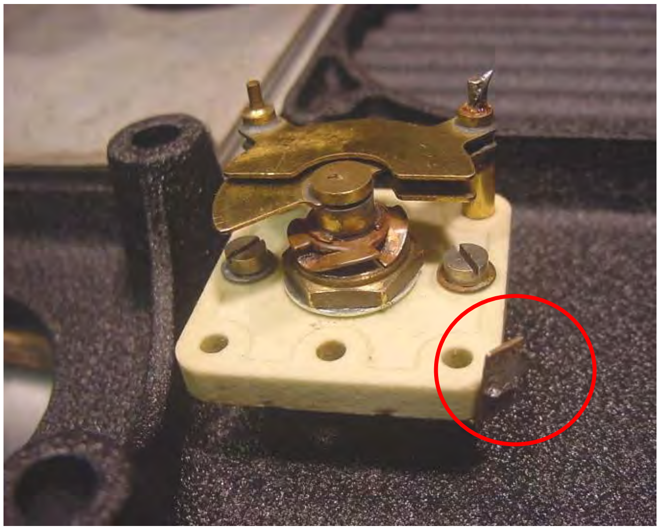
- Remove the flywheel from the tuning shaft and hold in place behind the front panel such that the tuning shaft can be re-inserted through it, place a thin washer and then the steel bushing retainer plate over the tuning shaft, which is then inserted through the appropriate hole in the front panel, placing the brass bushing (inside lubricated with a smearing of moly grease) onto the tuning shaft from the front of the panel (small lubrication hole upwards) and pushing the spring-loaded clutch onto the gearbox friction wheel. Insert the 3 x 6BA screws through the holes in the brass bushing and secure into the steel retainer plate. Adjust the position of the flywheel on the tuning shaft so it rests against the rear of the brass bushing and tighten the flywheel grub screw through the hole in the base of the front panel;



- Check that the friction drive is aligned correctly (that the spring-loaded clutch is engaged with the friction plate and the plate is not distorted – photo, left). Place a thin fiber washer over the shaft and then temporarily secure the tuning knob onto the tuning shaft and check for the classic Eddystone smoothness. If it does not feel really smooth then you may require a thicker/thinner washer(s) between the brass bush and the flywheel, the position of the flywheel adjusting or even packing washers under the heads of the three bushing securing screws to allow free movement;

- Do not lubricate the friction drive, but a small amount of moly grease can be applied to the gears and pinions in the gearbox.

The BFO tuning capacitor and crystal in-out/phasing control (photo, right) should also be attached to the front panel at this stage using the 6BA tapered-head screws. Note that the stator connection arm of the BFO capacitor must be rotated to the corner of the ceramic mounting plate (circled red in photo, below) to allow connection later, avoiding the underlying BFO and Send switch bodies. The crystal phasing capacitor and in-out switch assembly in my set still had wires attached from disassembling the set, ready to re-attach once the re-assembled front panel is back in place.

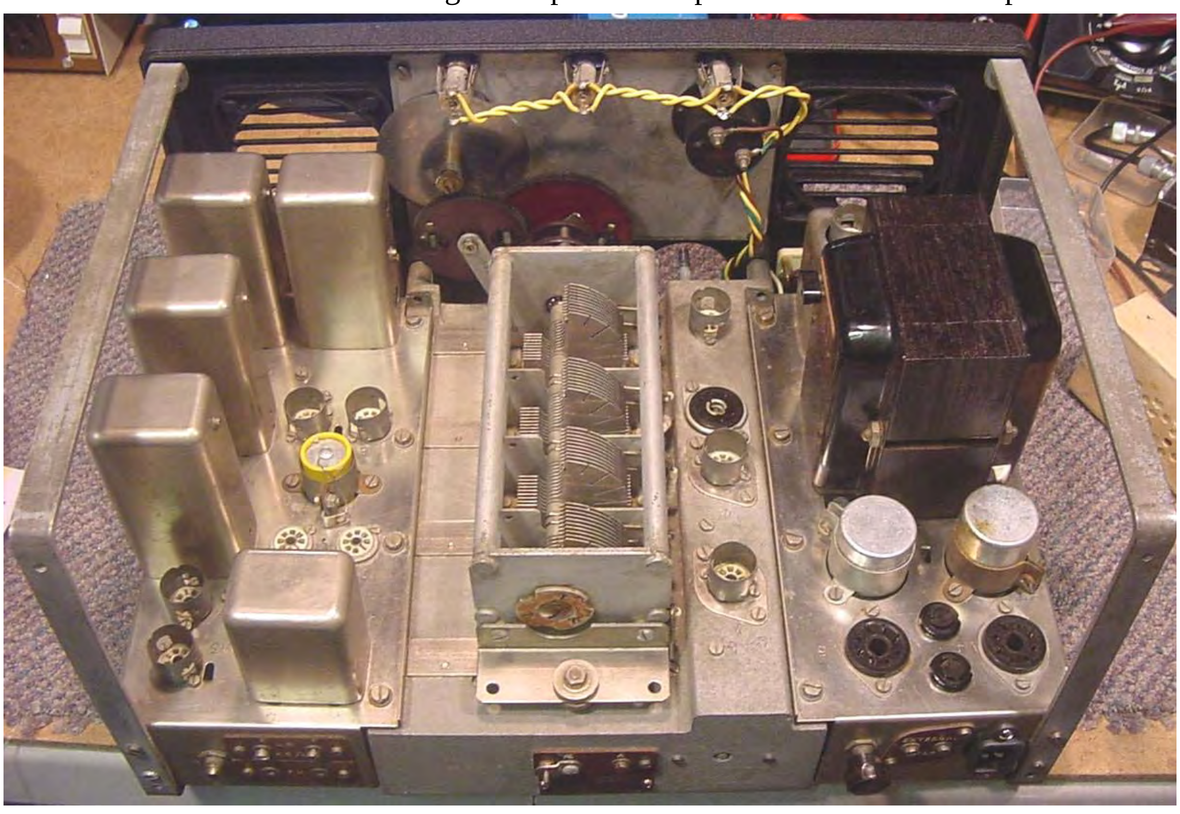


The next step is to re-attach the front panel to the chassis as follows:

- Sit the receiver chassis on the workbench facing upwards and tilted forward slightly using a block of wood between the bench and the rear plate of the tuning gang. This allows a good working angle to offer the front panel assembly to the chassis;
- Make sure the grub screws in the tuning gang flexible coupler are loosened. Place the front panel over the front of the chassis and start placing the control shafts into the corresponding holes in the front panel – start with the RF gain and AF gain controls, then the switches, securing temporarily with the shaft nuts;
- Gently maneuver the front panel into place, ensuring the tuning gang shaft flexible coupler is over the gearbox output shaft, that no wires are trapped and that the panel is eventually located tight against the coil box casting;
- Install the four bolts through the front panel and tighten into the coil box casting;
- Install the four bolts through the chassis side brackets into the chrome handles;
- With the front panel secured in place, re-wire the BFO capacitor and crystal phasing capacitor/in-out switch assembly to the chassis;
- Install the two tapered-head 6BA screws into the selectivity switch bracket;

- The control shaft nuts are now removed and the fingerplate installed, the shaft nuts being re-installed and tightened using a box spanner and large protective washer cut from a Teflon sheet to guard the fingerplate during tightening.

- Rotate the tuning gang capacitor until it is fully engaged, rotate the tuning knob fully clockwise and then adjust to '9' on the bandspread dial. Temporarily tighten the grub screws on the tuning gang shaft flexible coupler;
- Install the 'phones jack socket into the hole on the side of the front panel. I used a washer beneath the retaining nut to protect the paint finish on the front panel.



Fingerplate and Knobs

In Part I of this article, I described the development of reproduction artwork for the fingerplate[1] and mused on various ways of printing this and affixing to the metal fingerplate. After some deliberation, I decided that a simple laser printed version would suffice initially and I would monitor how it wore with time and use of the receiver - yes, and I am a cheapskate! - the benefit being it is easily (and very cheaply) replaced at any time. I also have a print of the artwork on semi-matte photographic paper that I may replace the current one with when/if I decide it needs 'freshening-up'.

So, with the fingerplate sporting its new artwork and two small pieces of double-sided sticky-tape on its rear side, the control shaft nuts were removed, the fingerplate placed on the front panel and the nuts replaced on the shafts to hold it in place.

The original tuning and bandswitch knobs (3146P) were installed[2], however, the receiver on arrival was fitted with a set of mongrel small knobs (looked like 1970's RadioShack specials). I had a set of NOS 1950's Eddystone small ribbed knobs in black[3] that were fitted in lieu of the original fitment smooth black knobs style (3469P)[4]. I will keep a look-out on Ebay and the like for a set of suitable smooth original-style knobs. However, in the meantime, only the really die-hard Eddystone purist would know any better (or care) – the set looks just fine to me.

[1] Now posted to the EUG web site for download, along with similar artwork for the S.640 and S.750
[2] Ok, so where did the originals go? and why? – was this an attempt at modernizing the set? or did they just fall off and get lost? Maybe they were used as walking stick tips or perhaps aliens took them…
[3] The ribbed style (4984/1P) were fitted to the S.770 receiver series
[4] Ian Nutt only had dark brown smooth knobs of this style in stock

The selectivity switch knob, a chrome-plated metal lever-style knob, had a slight split in the end where the metal over the end of the control shaft hole is very thin (photo, right) and the chrome-plating was worn away in parts. This knob was sent for repair and re-chroming at one of Pat's car restoration contacts.

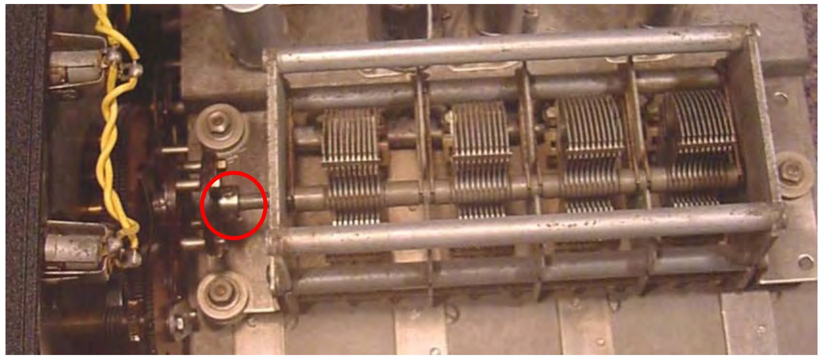
Post-assembly Checks

With the set fully re-assembled it was time to check operation again, in particular the function of all the controls. The set powered-up ok (phew!) and in rolled signals on all bands – this set is just so keen to bring in the DX… All controls functioned ok, however, I noticed that the AF gain pot was rather noisy and the RF gain pot showed some slight mechanical noise.

The AF gain pot is of the type that allows a squirt of De-Oxit to be applied through a gap between the connections and the pot body – this soon cured the noise there. The RF gain pot is a large (original) 10Kohm inverse log law wire-wound type – rare as hens teeth. The pot was working but its shaft seemed to be binding slightly. I placed the receiver with the front panel facing upwards and dribbled a little WD40 into where the shaft enters the bushing and left it 30 minutes or so, then applied a drop of light machine oil. That cured the binding. Even so, I think that at some point in the future the control will need to be removed and an overhaul attempted. At a pinch a 10Kohm linear law pot could be used, but the control behaviour would then become rather 'non-linear'.

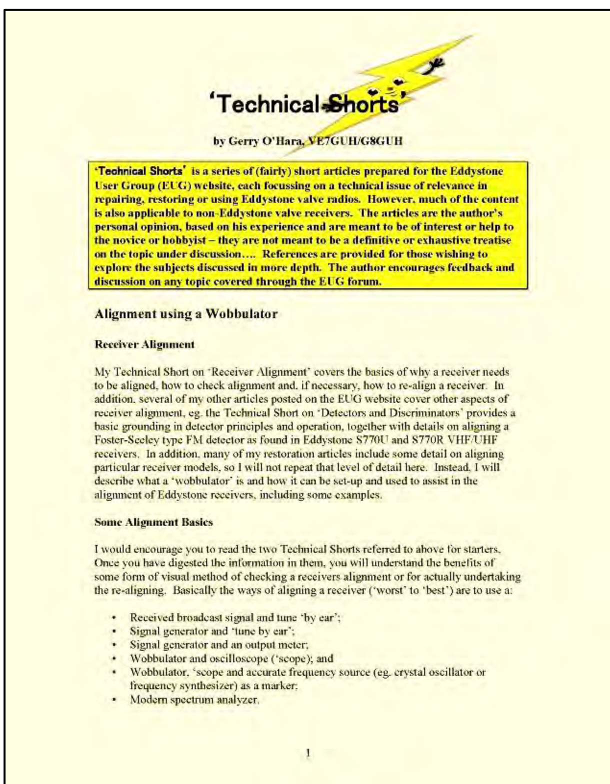
Alignment Checking/Re-alignment

After a few hours soak-test I was satisfied that all was working ok and the set was stable, so I decided it was time to check the alignment. During my initial assessment of the receiver on arrival, I had run through the bands and noted that it was fairly close in terms



of received frequency v dial readings. So the first thing to check after re-assembly was that for a known frequency the tuning gang was at the same position as before (as it had been only placed in approximately the correct position during re-assembly). This was done by tuning-in a 1MHz signal from the signal generator, loosening the (rear) two grub screws on the tuning gang flexible coupler (circled red, photo, above), setting the dial to 1MHz and tightening the two grub screws again. I then checked a few spot frequencies on each band and noted that the receiver was not far out – much as it had been before disassembly. However, I decided that a more thorough alignment check (and possibly re-alignment) was probably needed.

Like the S.680X manual, the S.680/2 manual contains the alignment procedure for the receiver – at least sort of: it provides the rudiments of the RF/Mixer alignment but does not provide full IF alignment instructions, instead noting that '*The alignment of a modern variable selectivity IF amplifier* [as in the S.680/2] *requires the use of a frequency modulated signal generator ("Wobbulator") and an oscilloscope, presenting a visual display to the operator.*' Not very helpful to anyone not having access to a wobbulator (and probably meant to discourage 'tinkerers' and those with only a little knowledge/equipment from tuning the IF circuits to the peaks, as although doing this will give a sensitive receiver, the four selectivity settings (and crystal filter) setting will most likely not function anything like to specification.



'Technical Shorts'

by Gerry O'Hara, VE7GUH/G8GUH

'Technical Shorts' is a series of (fairly) short articles prepared for the Eddystone User Group (EUG) website, each focussing on a technical issue of relevance in repairing, restoring or using Eddystone valve radios. However, much of the content is also applicable to non-Eddystone valve receivers. The articles are the author's personal opinion, based on his experience and are meant to be of interest or help to the novice or hobbyist – they are not meant to be a definitive or exhaustive treatise on the topic under discussion…. References are provided for those wishing to explore the subjects discussed in more depth. The author encourages feedback and discussion on any topic covered through the EUG forum.

Alignment using a Wobbulator

Receiver Alignment

My Technical Short on 'Receiver Alignment' covers the basics of why a receiver needs to be aligned, how to check alignment and, if necessary, how to re-align a receiver. In addition, several of my other articles posted on the EUG website cover other aspects of receiver alignment, eg. the Technical Short on 'Detectors and Discriminators' provides a basic grounding in detector principles and operation, together with details on aligning a Foster-Seeley type FM detector as found in Eddystone S770U and S770R VHF/UHF receivers. In addition, many of my restoration articles include some detail on aligning particular receiver models, so I will not repeat that level of detail here. Instead, I will describe what a 'wobbulator' is and how it can be set-up and used to assist in the alignment of Eddystone receivers, including some examples.

Some Alignment Basics

I would encourage you to read the two Technical Shorts referred to above for starters. Once you have digested the information in them, you will understand the benefits of some form of visual method of checking a receivers alignment or for actually undertaking the re-aligning. Basically the ways of aligning a receiver ('worst' to 'best') are to use a:

- Received broadcast signal and tune 'by ear';
- Signal generator and 'tune by ear';
- Signal generator and an output meter;
- Wobbulator and oscilloscope ('scope); and
- Wobbulator, 'scope and accurate frequency source (eg. crystal oscillator or frequency synthesizer) as a marker;
- Modern spectrum analyzer.

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The manual does, however, provide a series of (idealized) graphs indicating typical IF response curves at various selectivity settings plus crystal filter phasing responses, and also provides an indication of IF sensitivity (220uV applied to the grid of the first IF valve, V5, for 50mW audio output and RF input voltages across each range for 50mW audio output). When I re-aligned the S.680X I did not have a wobbulator handy (presumed to be several thousand miles away in my mother-in-law's garage in Burton-on-Trent, UK)[5]. Since that time though, I have constructed another wobbulator (photo, right) and also purchased a Wavetek sweep generator, so I am now reasonably-well equipped for visual alignment.

Although the receiver was functioning reasonably well and seemed to be not too far out of alignment, I chose to undertake a full re-alignment as I had noticed a 'double peak' when tuning through stations whilst on the widest ('Min' selectivity setting) – an indication that the IF section was not aligned correctly. I decided to first use a 'standard' receiver alignment method using an output meter and a signal generator/digital frequency meter (DFM) and to then use the wobbulator for final alignment tweaking of the response curves. My Tech Short on 'Receiver Alignment' (posted on the EUG website) covers typical standard alignment techniques and my Tech Short on 'Alignment using a Wobbulator' covers visual alignment techniques (also posted on the EUG website).

IF Alignment

Although the nominal IF of the S.680/2 is 450kHz, the actual IF frequency is determined by the crystal fitted to the particular set being aligned. For ease of reference here I refer to the crystal unit as T2, the 1st IF transformer as T1, the 2nd IF transformer as T3 and the third IF transformer as T4 (they are not annotated on the S.680/2 circuit diagram). Finding the resonant frequency of the crystal is the first job during re-alignment, thus:

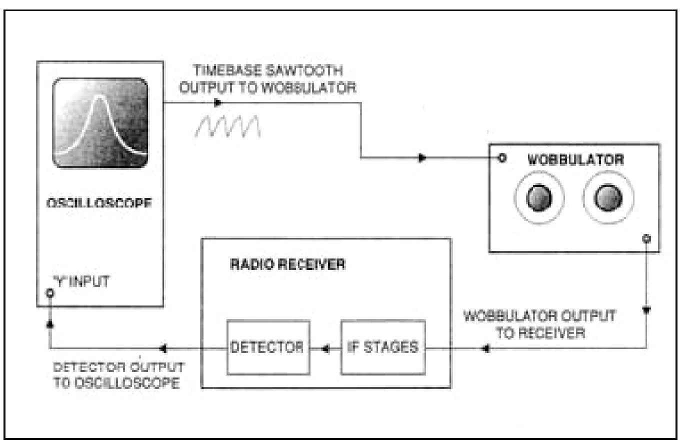
- Connect a signal generator to the receiver mixer valve grid (V3) with a 0.05uF capacitor, and in my case, an attenuator unit (as my DFM needs a high output from the signal generator to work properly);
- Short-out the local oscillator section of the tuning gang (nearest the front panel) to stop it working;
- Connect an output meter to the speaker terminals (I have a little speaker in a small box with a switch and dummy load that allows the meter to be connected and the speaker switched on/off for audio checks but allows silent tuning using the meter – the signal generator modulated tone drives me (and my family) nuts…;

[5] I checked the mother-in-law's garage during a visit to the UK in July, 2010 – unfortunately the wobbulator was not found, only my much-modified EC10 MkI (thank goodness!), a BC221 frequency meter, a variable AC power supply, a telephone handset, a WG16 straight and my 4' parabolic dish (this currently being deployed as a frog pond in my mother-in-law's back garden)

- With the selectivity switch on 'Max', centre the crystal phasing control (check that this corresponds to the phasing variable capacitor being at half-mesh) and the crystal switched into the circuit;
- Slowly sweep the signal generator through the nominal IF of the set (450kHz) and look for a kick on the output meter – it will be very sharp, so sweep slowly. At the peak of the kick, record the frequency – this is the resonant frequency of the crystal filter in your set and is the frequency to be used in the IF alignment. In my set this was determined to be 450.3kHz – pretty damn close to the nominal IF frequency;
- Peak T2 and then T1, followed by T4 through T1[6] and repeat T4 through T1. The set is now peaked 'on the nose' of the crystal frequency;
- Switch the crystal out of circuit, remove the local oscillator gang short circuit, connect an aerial and do a listening check on the four selectivity positions – you will note that there is not as much difference between the four positions as you would expect as the coupling between the primaries and secondaries of T1, T3 and T4 are varied using the control. Unfortunately this is what has happened to many such sets over the years as folks have re-aligned them with basic test equipment and some knowledge of re-aligning receivers – and is just what the Eddystone engineers were trying to avoid by the words in the manual;
- If you do not have access to a wobbulator (or spectrum analyser), setting the IF transformers to provide the correct responses is, to say the least, a bit of a hit and miss affair… you can try stagger-tuning the IF transformers slightly by guessing, listening and a finger in the wind – and good luck with that method!

Instead, I will describe how a wobbulator can be used to check and tweak the IF response curves. In summary, the method I used is as follows:

- The basic equipment arrangement is shown on the figure below:
    - A connection from the oscilloscope timebase (ramp) circuit to the wobbulator 'ramp input';
    - A connection from the wobbulator (swept) output, centered at a nominal 450kHz, and the sweep width set to be slightly wider than the full IF bandwidth (say 20kHz), via an attenuator to



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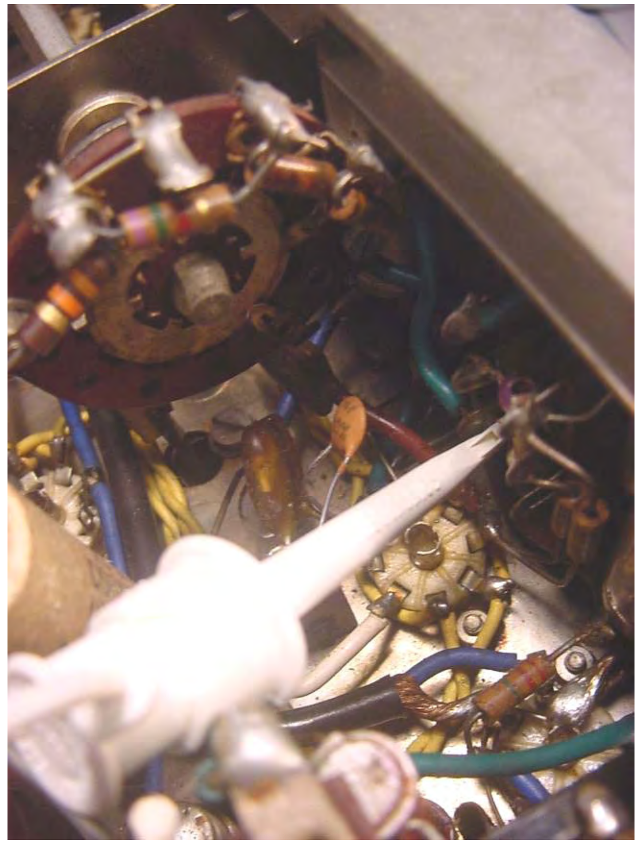
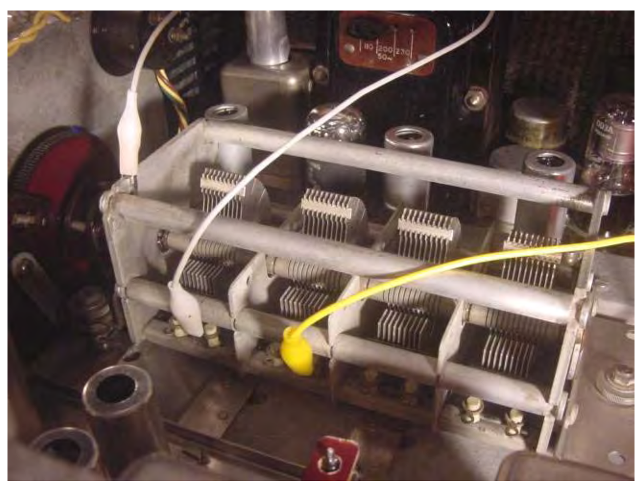
[6] Note that the IF transformers in my S.680/2 have only one section of each transformer available to adjust (the upper hole in each giving access to a tuning slug), the lower hole reveals an untouched wax-seal only



the input of the IF stage - the grid (pin 1) of the mixer valve (V3), for observation of the full IF response including the crystal filter circuit (note: if you connect the wobbulator to the anode of V3, the primary of T1 is damped and the slug has minimal effect on the tuning). I isolated the output of the wobbulator somewhat from the grid using a 2.7kohm resistor and a 0.01uF capacitor in series;

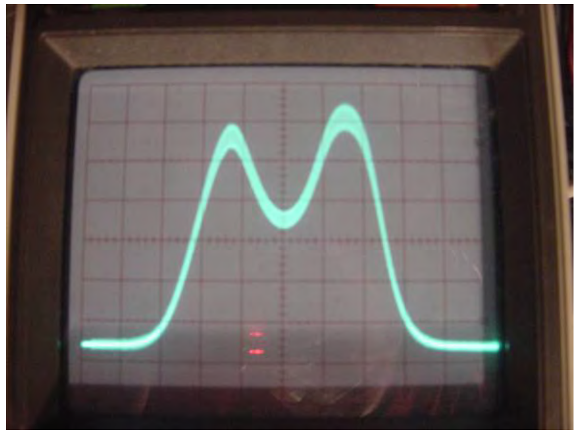
- A connection from the 100kohm section of the detector diode load/IF filter (junction of R32, R33 and C83) to the scope Y input (via a x10 probe). This circuit node can be easily accessed as shown on the photo, above;



- Disable the local oscillator by shorting out the section of the tuning gang nearest the front panel (photo, right – white wire);
- Connect a signal generator (and DFM if the generator does not have an accurate frequency readout like mine) to the IF input (grid of V3 – photo, right, yellow wire) to provide a tunable marker 'pip' on the response curve. I used a 47kohm resistor in this line to provide some level of isolation between the wobbulator output, IF input and signal generator (the resistor value was found by trial and error);
- Set the 'scope timebase to the slowest rate at which viewing is still comfortable (this minimizes phase-distortion of the display);
- The wobbulator sweep width and output level, together with the oscilloscope Y-gain, timebase and trace position controls are then adjusted to show almost the entire response curve (or desired part of it) on the 'scope screen;
- If it is desired to have a semi-quantitative display, the Y-gain can be adjusted in conjunction with an attenuator between the wobbulator and the set to provide a

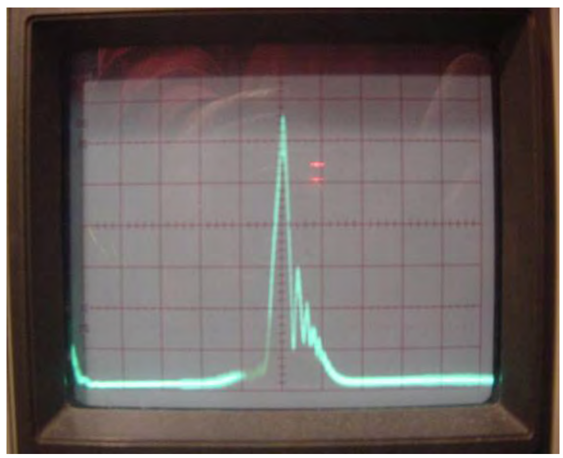
crude db calibration of the vertical scale (Y-axis). The marker oscillator/DFM can be used to provide calibration of the oscilloscope X-axis.

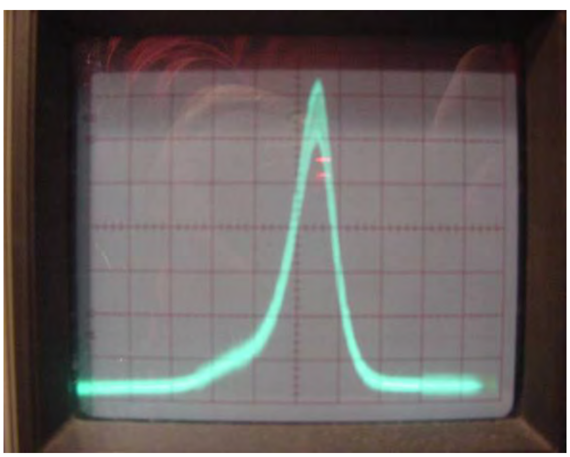
The marker was first centered on 450.3kHz (as measured on the DFM) and the wobbulator centre frequency adjusted to the same frequency. I actually tested the 'as received' IF strip frequency response curves with this set-up prior to undertaking the crystal filter frequency determination described above. As suspected from my listening test, response at the widest ('Min') setting was a double-peak (photo, right), typical of an attempt at de-tuning one or more IF transformers to obtain the desired frequency response characteristics of the IF strip – but as can be seen, not too satisfactory.



With the wobbulator and signal generator connected as detailed above, the slugs of T1 through T4 can be adjusted (slightly) to alter the observed IF frequency response curve on the 'scope. I found that T1, T3 and T4 gave the most satisfactory adjustments. The overall aim is to replicate the shapes of the set of selectivity curves as depicted in Fig. 6 of the manual. The following traces were obtained after completing the adjustments:

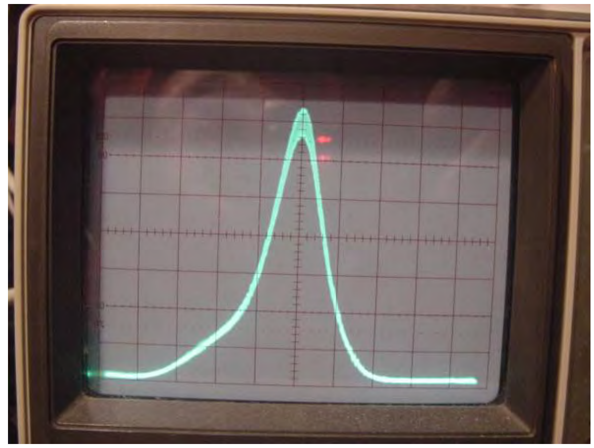
Right: 'Max' selectivity position with crystal filter in circuit – note the extremely sharp 'nose' to the response coupled with very steep skirts.

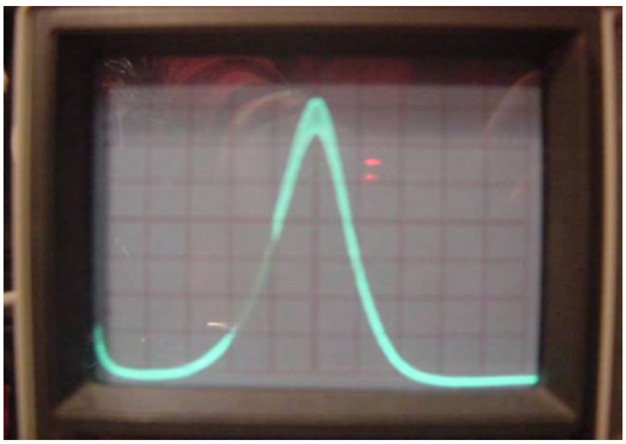




Left: 'Max' selectivity position without the crystal filter. Wider 'nose' and less steep skirts than with the crystal filter in circuit

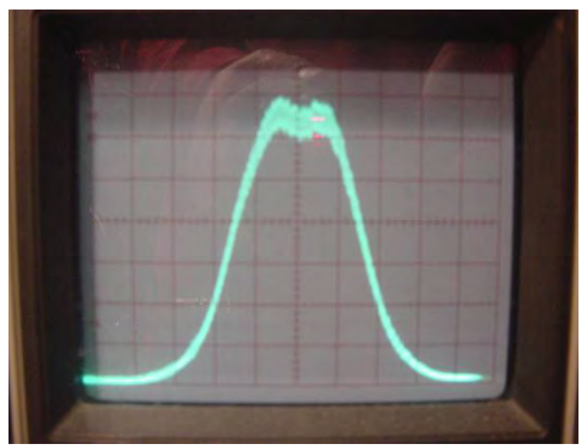
Right: 1st 'Intermediate' selectivity position without the crystal filter. Slightly wider 'nose' and less steep skirts than at the 'Max' selectivity position

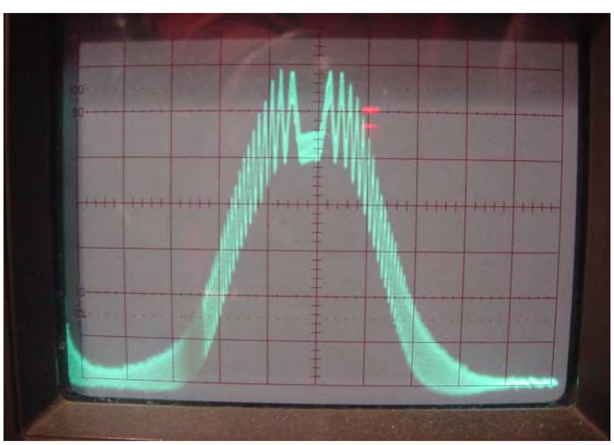




Left: 2nd 'Intermediate' selectivity position without the crystal filter. Wider 'nose' and slightly less steep skirts than at the 1st 'Intermediate' selectivity position

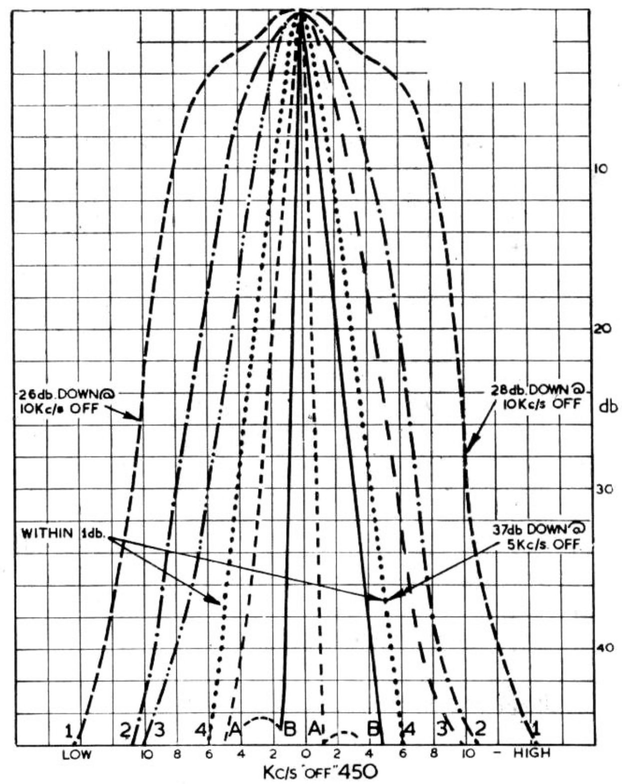
Right: 'Min' selectivity position without the crystal filter. Flattened 'nose', yet retaining steep skirts – better for higher fidelity on stronger AM signals





Left: 'Min' selectivity position without the crystal filter. Here with the marker oscillator on – this providing a zero beat in the centre of the received bandwidth

After some tweaking, the scope traces obtained were very encouraging (examples on previous two pages), both symmetrical about the centre frequency and showing that the bandwidth specifications given in the manual were almost being obtained (figure, right) – good enough for me anyway. After disconnecting the set-up, an on-air test confirmed correct operation of the selectivity control and no double-peak on the widest setting.



Selectivity curves for the "680" Receiver.
(1) —— —— —— minimum position.
(2) — · — · — first intermediate position.
(3) — · · — · · — second intermediate position.
(4) · · · · · · · maximum selectivity.
(A) — — — — — maximum selectivity, with crystal filter in, and phased to reject signal on one side.
(B) ———————— as "A", but with crystal phased on other side.

RF Alignment

Following visual re-alignment of the IF section, I followed the method described in the manual to re-align the RF section – easier said than done in this case as most of the tuning slugs were stuck in their formers and took some coaxing to get moving. However in four cases no amount of coaxing (warming with a heat lamp, gentle clockwise/ anticlockwise rocking of the slug, drop of paraffin etc) succeeded in moving the slug. In each case the slug had to be drilled (using progressively larger bits) until I could insert a screw to gently break-up the slug in the former – you would think they had been glued in there! – not glue though, but a mixture of perished rubber threads, plastic strips, wax and bits of iron dust slug – set hard (photo, left)[7]. As the slugs were broken-up, the pieces were removed using a soldering tool (long, thin, sharp angled pick), moistened Q-Tips, compressed air and vacuum, all the while being extremely careful to avoid damage to the former. Also, note that some of the formers have wires in the base – avoid damaging these. Care should also be taken to avoid any of the

[7] Evidence of many re-alignments over the decades and attempts at preventing the slugs from moving using various techniques. I suspect the wax was the original method used at the factory

iron dust from the broken slugs/formers from entering the air-spaced trimmers – a grain of the dust between the stator and rotor can cause problems here. Given all this, I decided to remove every slug and clean the slug threads and formers of any debris/wax etc. to avoid future problems. One slug that seemed to move ok was found to be only half a slug when I removed it for cleaning – the other half had detached and was stuck in the lower half of the coil former – another careful drilling and break-up job. I used a spot of Rocol Kilopoise high-viscosity lubricant on the slug threads prior to inserting to mitigate unwanted movement due to vibration and yet allow easy and reliable adjustment of the slugs in the future. In all, five new slugs were installed plus the one I installed in Part 1 (lucky I have a small supply). This little 'operation' alone took over four hours. After that, the RF re-alignment went smoothly, with the scale showing good calibration across each range and sensitivities much as the specification.

Careful shrouding of the surrounding trimmers when cleaning out debris from the slug

Drilling the centre of the broken or stuck slugs

Finally I replaced the coil box cover and undertook a last tweak of the local oscillator, mixer, RF and aerial trimmers with this in place (note: the slugs are not normally accessible with the cover fitted, but a previous owner of my set had drilled extra holes for slug adjustment with the cover installed, however, replacing the cover will have minimal effect at the low end of each band). I then removed the signal generator and output meter, connected a speaker and aerial and checked out the receiver performance on each band.

On-Air Checks

I found the set to be very sensitive and very selective on all bands, right up to 30MHz – certainly as good as I recall the S.680X being. Well, ok, the image rejection on the higher bands is not as good as it really needs to be, but it is not too bad considering it is a single-conversion superhet (though I am still puzzled as to why dual-conversion was not a design feature in this high-end set: the technique was used shortly afterwards in the lower-end S.750 to great effect).

Amateur SSB stations rolled-in on 20m and 80m (need to wind-down the RF gain quite a bit though as the BFO easily gets swamped), Radio Australia, Radio China, lots of Central America and Southern America stations – all on a few feet of wire strung up the side of the house. On the broadcast band, stations romped-in, pushing the S-Meter almost against the end stop – the wider selectivity positions adding to the fidelity as expected. The crystal filter performance was checked on CW stations operating in the 40m and 20m amateur bands – the phasing control working to very good effect.

Conclusion

I had really been in two-minds whether to go for this set – the look of the fingerplate and generally unkempt cosmetic appearance putting me off, as well as the seeming endless time it took for the estate sale to proceed. However, when I realized that a matching speaker and an S-Meter for my S.750 were also available and a deal could be had for all three, coupled with very reasonable shipping costs, I decided to go for it. Boy, am I glad I did – the set now looks very close to original and, apart from the few (reversible) mods I did for safety and protection reasons, it could be straight off the Bath Tub's production line in June 1949. And, of course, I no longer covet the SPARC museum's S.680X (well, maybe just a tiny wee bit).

One of these days I will take my S.680/2 to meet the SPARC museum's S.680X and undertake a direct on-air comparison on the same aerial – the sets should have very close performance as the circuit is almost identical, however, my S.680/2 has a Loctal mixer valve – wonder if it makes any difference to performance? The main reason to compare in my book, however, is to do a side/by-side comparison of the half moon v sliderule dial on sets of similar electrical characteristics – ease of tuning, station 're-setability' etc.

On another note, one of my next Eddystone projects is an S.640 'basket case' that Chris Harmer donated to me – I am sure it will make the S.680/2 restoration look like a stroll in the park. I have been looking-out for an S.640 on this side of the pond for some time (without any luck), as this model holds some fond memories of my youth. So, whatever I can do for this poor set will be a labour of love. Oh - I do like a challenge! - watch this space…

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References

- Radio and Television Servicing – Pre-1953 Models, F. Molloy & W.Poole, pp 244, 253 - 257
- Various documents downloaded from the EUG website (http://www.eddystoneusergroup.org.uk/), including:
  - The Ultimate Quick Reference Guide (QRG), 2nd Ed., 2005, Graham Wormald, G3GGL
  - S.680 and S.680X Manuals (the circuit in these differs slightly from the versions in Molloy & Poole)
  - Technical Shorts on 'Receiver Alignment' and 'Alignment Using a Wobbulator'

Above: really classy dial eh? - and who would know that fingerplate was a laser print on stock printer paper? By the way, the knurled round switch retaining nuts are new items purchased from Radio Daze, part No. NT-CTL3-10 (www.radiodaze.com) – the originals were worn almost smooth with decades of being manhandled with old pliers, pinched hands and lots of swear word combinations…


EDDYSTONE
MEGACYCLES
Kc/s
BROADCAST
MADE IN ENGLAND
A.F. GAIN
SELECTIVITY
XTL IN
XTL OUT
A.V.C.
N.L.
TUNING
B.F.O.
R.F. GAIN
MAIN SWITCH
SEND


EXTERNAL
RELAY
A
L.S.
2·5 Ω
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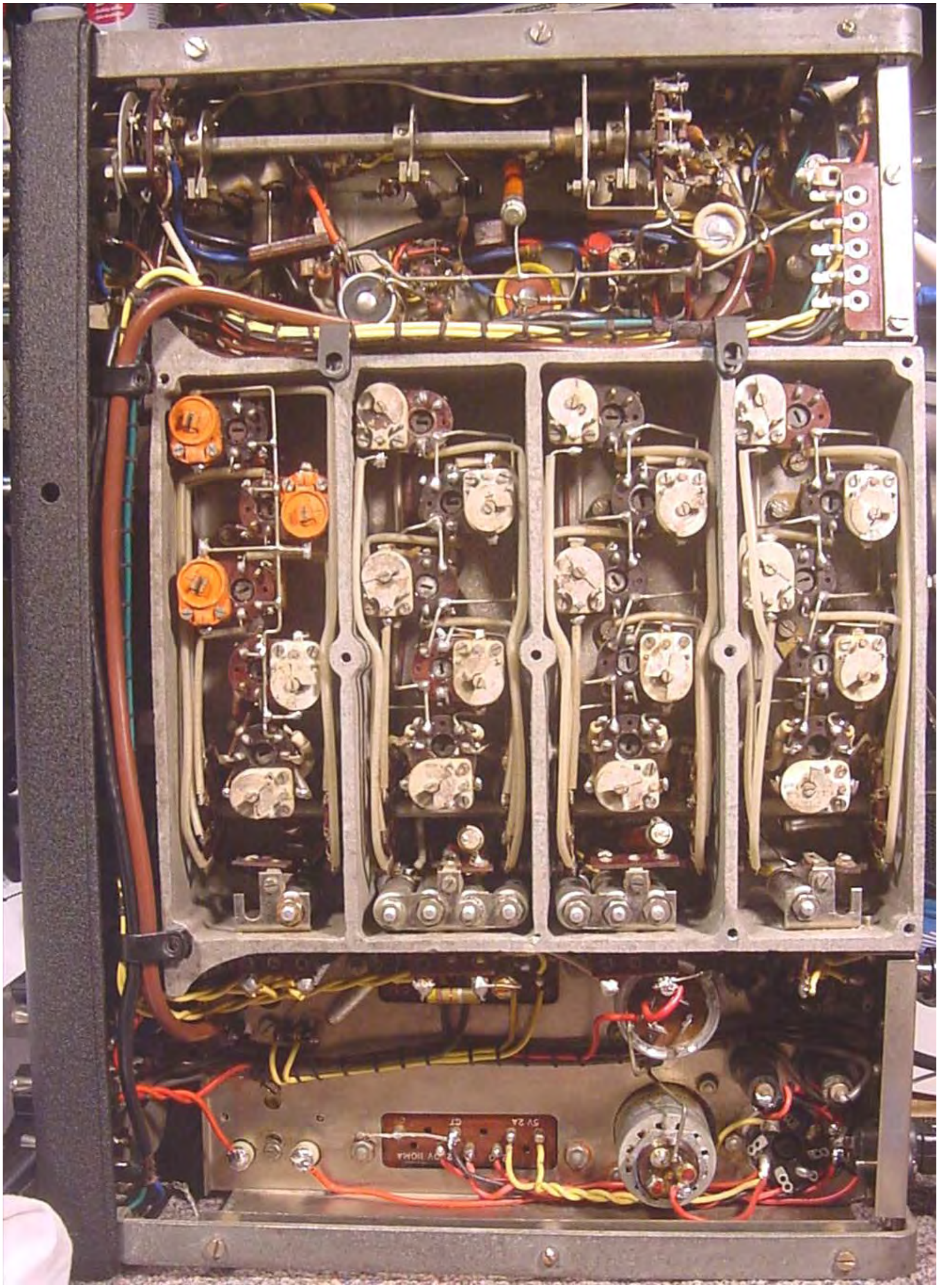
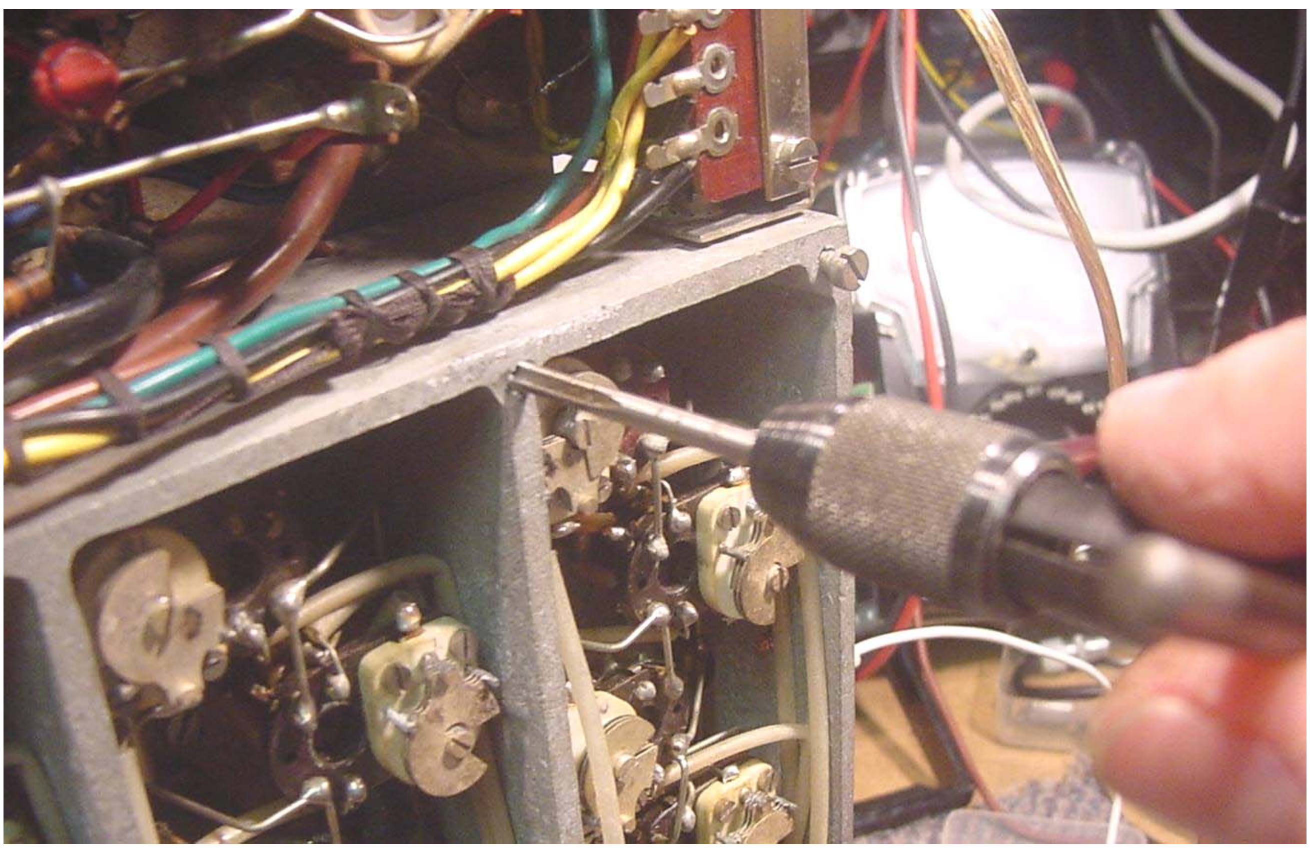
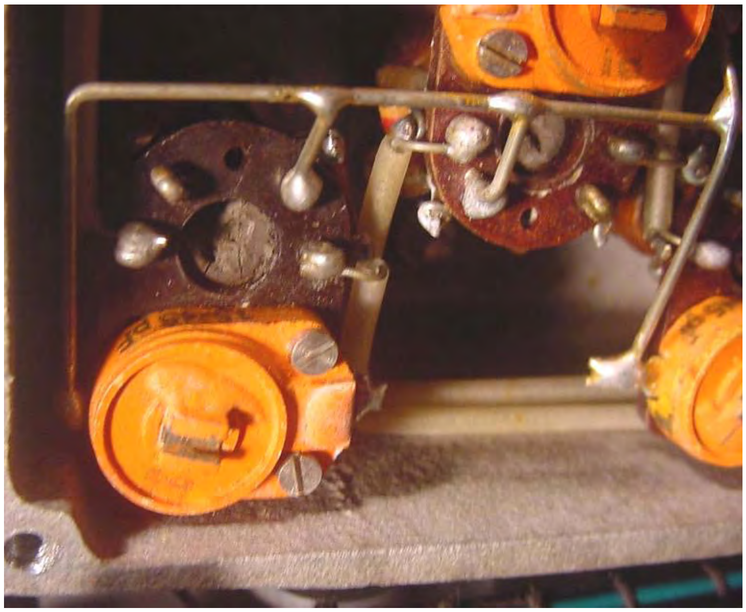


Left: using an airbrush nozzle to clear out debris from the broken slug – 75psi is quite effective at this task.

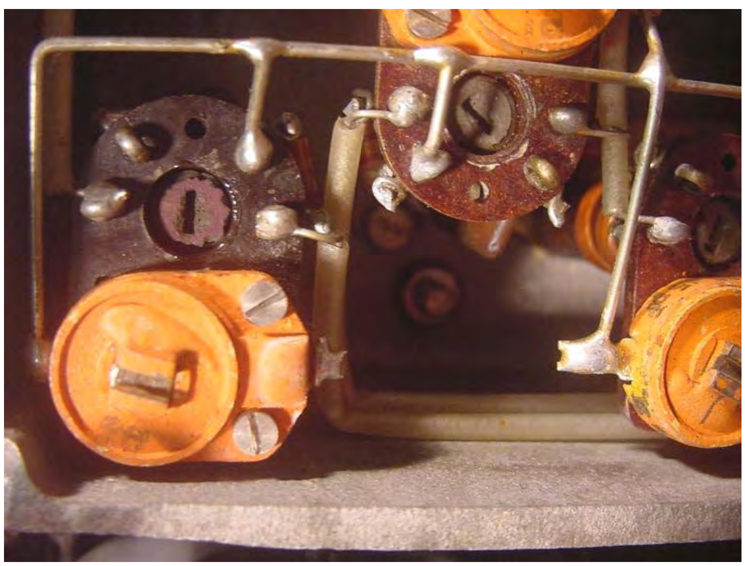
Below: using a 4BA tap on the repaired screw hole in the die-case aluminium coilbox before re-fitting the cover (repair described in Part 1 of this article)



Left: the second IF transformer (T3) showing that the adjustable slug is the upper one – the lower hole reveals a wax-sealed coil former with no slug accessible (and I was not going to poke about in the wax to try without good reason).



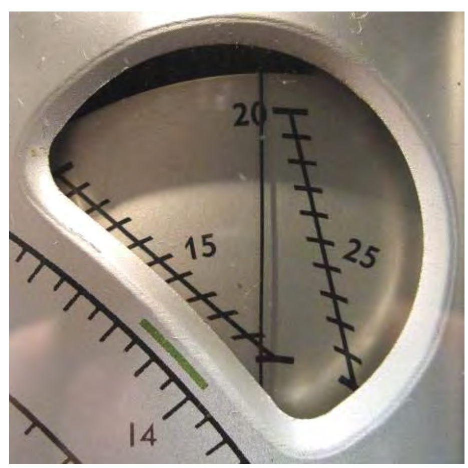
Above right: the Range 5 local oscillator slug mangled trying to adjust it as the slug was stuck tight in the coil former. Do not despair if this happens to you! – however, you will need lots of patience and care if damage to the coil former is to be avoided. Best leave it for half an hour and have a cup of tea, a Garibaldi biscuit (or two), several deep breaths and get any swearing out of your system… Right: after the cup of tea, Garibaldi biscuits, several deep breaths and just a little therapeutic swearing.




L.S.
2·5 Ω
P.U.


EXTERNAL
RELAY

Above: the completely-restored S.680/2 burbling-away on the workbench on soak-test for a couple of days, complete with its matching speaker (incidentally the speaker is 'as received' – no work on the paintwork, apart from very minor touch-up of paint-chips). All-in-all this was a very satisfying project – I really love these Eddystone 'half-mooners'!



Right: close-up of the bandspread vernier – one complete revolution of this scale corresponds to the movement of the main dial pointer over one division of the inner (logging) scale of the main dial. The vernier scale is read against the vertical hair-line on the window. The actual equivalent logging scale length is some ninety inches.